

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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CONTENTS

VOL. 26, No. 323



A BEAUTIFUL SPOT ON SNOMASS LAKE IN
THE HOLY CROSS NATIONAL FOREST

Autumn—By Mary Adelaide McTighe.....	642
Editorial.....	643
Large Trees for Memorial Planting.....	646
Vallombrosa Forest in Italy—By Nelson Courtlandt Brown.....	647
With fifteen illustrations.	
Progress of Forestry in China—By John H. Reisner.....	655
With five illustrations.	
Forest Recreation—By S. E. Doering.....	659
With seven illustrations.	
Scented Woods—By Samuel J. Record.....	665
With twenty illustrations.	
A Remarkable Specimen of Quartered White Oak.....	672
With one illustration.	
Foxes—and What We Know of Them—By Dr. R. W. Shufeldt.....	673
With ten illustrations.	
Chinese Forest Tree Seeds Available.....	681
Forest Conservation by Better Utilization—By Ovid M. Butler.....	682
Forestry Editorial Digest.....	684
National Honor Roll, Memorial Trees.....	686
The Pulp and Paper Industry—By George W. Sisson, Jr.....	687
Maple Sugar in Colonial Times—By Laurence R. Grose.....	689
Federal Legislation Needed.....	691
Cox for a Forest Policy.....	692
Britain Plants American Tree Seed.....	692
Portugese Appreciation of Trees.....	692
Canadian Department—By Ellwood Wilson.....	694
State News.....	695
Book Reviews.....	697
Forest School Notes.....	700
Smokers Urged to Use Care in the Woods.....	704

CHANGE OF ADDRESS

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AUTUMN BY MARY ADELAIDE McTIGHE

(An Indian Fragment)

WITH stately, solemn tread, and silent, moccasined feet---
across the mountains, and down the sloping hills, through
many a valley and winding defile, comes the Great Chief Autumn,
to visit the land where dwelt his forefathers of yore.



Gorgeous in warpaint; and scarlet and yellow dyed feathers
and quills, with the scalps of numberless flower victims.

At his threatening aspect the timid plants grow pale, and
shrink with fear.

Suddenly appearing in the open, he hesitates, as if to gather
his forces for a fierce onslaught; then, with a savage war
whoop, he hurls back at the still unconquered trees the keen
edged hatchet of his wind; and reluctantly, they drop their
leaves, in token of surrender and defeat. But he, indifferent
--unconcerned--stalks along, in all the pride and arrogance of
his race.

Gazing over the land where his fathers hunted and fished
before the coming of the hated Pale Face, who tricked him
and robbed him of his own, his heart burns with a fierce desire
for revenge, and he plans it well.


Lurking behind underbrush and boulder, hiding in ambush
through many a warm, sunny day; resting, and patiently
waiting his chance,---deceiving his enemies into the belief that
he is still far away, he stoops low and creeps stealthily on;
now, bounding like a deer from rock to rock, he wakes the
Fire Serpent, that slumbers mid the dead mosses and leaves,
and starts him on a path of destruction across the wooded
slopes.

Darkness reveals the devouring monster crawling and
wriggling his way, like some huge Glow Worm on the moun-
tain heights, that leaves a scorched and blackened trail wher-
ever he has passed, tarnishing the morning sun with his murky
breath.

Glutted with revenge, seeing the devastation he has wrought
---spent with weariness and fatigue, Autumn, pillowed on the
rounded hills, stretches his gaunt form to rest.

There, sleeping under the quiet stars, his ever-pursuing foe,
Frost-in-the-Night, comes suddenly upon him and treacher-
ously pierces him to the heart

For many days, borne on the wings of the wind from the
farthest west, comes the moaning and the wailing of the
Squaws: and the bending Pines wave their dark funereal
plumes where the Great Chief lies, stark and dead.



AMERICAN FORESTRY

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EDITORIAL

ANOTHER ORGANIZATION TO PREVENT FOREST FIRES

ON the same day that the council of wood-using industries was being organized in Chicago, representatives of state forest organizations, the Forest Service, private forestry associations, and educational institutions was held at Albany to discuss ways and means of furthering a forest program for the Nation. The final outcome of the conference was the organization of a National Committee for Forest Fire Prevention. Mr. George D. Pratt, Conservation Commissioner, New York State, was made chairman, and Mr. Harris A. Reynolds, secretary of the Massachusetts Forestry Association, secretary. These officers, together with Colonel H. S. Graves, formerly Chief of the Forest Service; Mr. J. E. Rhodes, secretary of the Southern Pine Association, and Mr. W. T. Cox, State Forester of Minnesota, constitute the executive committee, which is clothed with rather broad authority to take such action as its judgment warrants. It was the sentiment of the meeting that this committee should organize with representatives from the various states in order to take common counsel and to bring pressure to bear for the enactment of both Federal and State legislation along the lines of fire protection.

The formation of this new committee is of particular significance because it offers a common meeting ground for those interested in the adoption of a national forest program who do not readily fit into any of the other organizations already in existence. The Forest Service, Society of American Foresters, National Lumber Manufacturers' Association, American Paper and Pulp Association, and the Council of Wood-using Industries, are each composed of individuals having a common interest

which is not necessarily the same as that of another group. Quite outside of these groups is a large part of the general public which is vitally interested in the perpetuation of our forests but which at present has no affiliations. The new National Committee for Forest Fire Prevention may perform a useful function by serving as a rallying ground for these and affording them an opportunity to make their views known.

The one unfortunate feature of the new organization seems to AMERICAN FORESTRY to be the self-imposed limitation of its scope to forest fire prevention. No one disputes the importance of this. Adequate fire protection is the first essential and an absolute prerequisite for other measures. There are, however, other phases of the forest problem that cannot be ignored. There are, for example, considerable areas now forested on which natural reproduction will not take place following cutting unless an adequate number of properly distributed seed trees are left. These areas must be handled under the methods of forest management found most effective for the particular type of forest in question. There are other large areas of forest land already denuded and needing planting. If the forest and wood-using industries in specific localities are to be maintained, steps must be taken to regulate the cutting of the forests so as to insure a continuous supply of timber. All of these are integral parts of any really comprehensive forest program. It is to be hoped that this new National Committee will see its way clear in the near future to enlarge its present scope so as to include at least the all-important subject of silviculture.

A COUNCIL OF WOOD-USING INDUSTRIES

THE movement inaugurated by the conference of wood-using industries at Madison, Wisconsin, last July is now taking definite shape and gives every promise of playing an important part in shaping the forest policy of the country. On September 28 the steering committee appointed by this conference arranged for a meeting at Chicago which resulted in the organization of a Council of Wood-using Industries. This is in a way a super-organization embracing the sixty odd associations of furniture, veneer, and vehicle manufacturers, wood turners, wood preservers and numerous other wood-users already in existence. In some respects it can be looked upon as performing approximately the same function for

consumers of forest products as the National Lumber Manufacturers' Association does for producers. The newly formed council at its Chicago meeting adopted a constitution, elected Mr. Edward E. Parsonage, president of the John Deere Implement Works, as president, and outlined the general scope of its activities.

The wood-users have two primary objects in view in the step which they are taking. These are, to perpetuate the forests of the country through fire protection, reforestation, and improved methods of forest management, and to promote the more efficient and economical use of forest products. Both objects are worthy of the heartiest support from all those interested in forest conservation.

If this country is to continue to meet its own needs for wood and other forest products, it must keep its forest lands productive and must make the material produced go as far as possible. That important results of immediate application can be secured in the latter field has been demonstrated by the ten years of research conducted by the Forest Products Laboratory at Madison. Recent investigations by the wood turners have also indicated the possibility of effecting amazingly large savings by standardization of specifications, the more careful saving of dimension stock, and similar measures. Increased forest production is equally essential, however, and it is greatly to the credit of those who utilize but who as a rule do not grow the wood, that they should recognize this fact.

That the movement for the practice of forestry now under way in this country will receive a decided impetus

from the organization of the council of wood-using industries cannot be doubted. These industries represent an investment of hundreds of millions of dollars and form the backbone of many communities throughout the country. Many of their leaders are leaders also in the business world and any recommendations that they may make will carry considerable weight. It is therefore a hopeful portent that these industries through their newly organized council are planning to study the various suggestions already made regarding the adoption of a forest program for the country with a view to reaching conclusions which they can support and which they will endeavor to have enacted into law. AMERICAN FORESTRY congratulates them on their foresight and public spirit, and wishes them all success in the work they have undertaken.

A GOOD MOVE

DURING the summer a conference was held at the Forest Products Laboratory at Madison, Wisconsin, which bids fair to result in bringing closer together those interested in forest production and in wood utilization. Its primary object was to discuss the training of specialists in forest products along lines which, in addition to furnishing a fundamental education in engineering or the physical sciences, would include enough forestry to give them the forester's point of view and to enable them to connect their specialty with the growing forest. The conference expressed its approval of a combination course of this sort and appointed a committee to work out the details and to report with recommendations to be a proposed general conference on forest education to be held early next winter. Much good should come of the movement which has thus been started. There is no

doubt that men engaged in forest products work, whether in research or in industry, will be better equipped for their task if they have a real understanding of forest production and the place of forestry in the life in the nation. There is equally little doubt that those whose primary care is the growing, management and utilization of forests will gain from the closer contact with their fellow workers in the field of forest products that will inevitably follow when the latter are trained in forestry as well as in engineering or chemistry. Increased forest production and increased efficiency in the utilization of forest products are but two, and equally important, phases of forest conservation. Any movement that emphasizes this fact and that serves to bring about a closer co-operation between workers in the two fields is worthy of all support.

IN BEHALF OF FOREST EXPERIMENT STATIONS

THE Arizona Wool Growers' Association and the Arizona Cattle Growers' Association at a joint meeting in Flagstaff last summer passed a resolution favoring the abolition of the Fort Valley Experiment Station on the ground that its work "has been an entire failure and a useless expense to the amount of approximately \$20,000 per annum." The resolution was adopted without discussion, and subsequent developments have indicated that many of those at the meeting did not appreciate its significance and had no desire to interfere with the investigative work of the Forest Service. Fortunately no harm seems likely to come of the incident. It does, however, call attention to an unfortunate condition, namely, the widespread lack of knowledge of the activities of the forest experiment stations and consequent failure to appreciate their true value.

The Fort Valley Experiment Station has been in existence for more than twelve years. During this time, as a result of carefully planned and systematically con-

ducted investigations, it has demonstrated that by proper methods of cutting and protection reproduction of western yellow pine, by far the most important species in the Southwest, can be obtained and costly artificial reforestation avoided. It has also shown that planting, which for many years met with complete failure, can be successfully conducted in accordance with methods developed by the station on denuded areas where natural reproduction would be wholly out of the question for many decades, or perhaps even centuries. It has secured much information regarding the relation between forests and their environment which will be of great value in the development of improved methods of forest management. In short, its activities have yielded results of immediate practical use in the face of exceptionally adverse conditions.

It is safe to say that the cattle and sheep men at the Flagstaff convention to whom these facts were known could readily be counted on the fingers of one hand.

Doubtless the resolution advocating the abolition of the station was not adopted because of any desire to injure a valuable line of Forest Service work but because of unfamiliarity with this work. Unfortunately the cattle and sheep men are not the only ones in this position. The majority of lumbermen and timberland owners are probably equally ignorant of the work of the Fort Valley and other experiment stations. It would not be surprising if a considerable proportion of the general public never heard of forest experiment stations and have no conception of their place in the perpetuation of our forest resources. Even to Congress the stations are largely an unknown quantity, and this ignorance of their activities and value doubtless played an important part in the reduction for the present fiscal year of the appropriation for the maintenance of such stations.

As a matter of fact, forest experiment stations must be depended on to furnish the fundamental facts on which to base the management of the forests of the country. They are comparable to agricultural experiment stations, the value of which is universally recognized, but are if anything even more essential since they deal with a long-lived crop which can be thoroughly studied only by carefully organized investigations covering a considerable period of years. If any of the various forest programs now being agitated are to be made really effective, the

measures which they propose must be based on results secured in large part at adequately manned and equipped forest experiment stations. AMERICAN FORESTRY would like to see such stations established at the earliest possible opportunity in every one of the principal forest regions in the country.

Every timberland owner, every lumberman, and every other user of forests and forest products is more or less intimately affected by the way in which our forest resources are handled and should consequently be interested in the adequate development of those agencies which will make our forest management as effective as possible. There is therefore a real reason why they should become familiar with the work which the forest experiment stations are now doing and give their support to the extension of this work to the entire country. In this case it is safe to say that familiarity will breed, not contempt, but a lively interest in and appreciation of the past accomplishments and future possibilities of the stations. Close co-operation between the stations and those benefiting from the results of their work will prove of benefit to both, and AMERICAN FORESTRY hopes that such co-operation will be much more general in the future than it has been in the past. That it will be a paying investment for all concerned there can be no doubt.

BRITISH IMPERIAL FORESTRY CONFERENCE

THE British Empire Forestry Conference held in London last summer constituted a notable event for foresters and others interested in forest conservation throughout the world. That such a conference should have been called in a country which has hitherto been notoriously indifferent to its forest resources is in itself a significant fact. Added significance is given by the cosmopolitan character of the attendance, which was made up of thirty-five delegates from all parts of the empire. These will carry home with them new ideas and new inspiration for the work which lies ahead. Their deliberations and conclusions should also result in a decided stimulus to the forestry movement in other countries as well as in the British Empire.

The resolutions adopted by the conference were remarkably comprehensive and farsighted. Each of the governments included in the Empire was urged to lay down a definite forest policy to be administered by a properly constituted and adequate forest service. This policy should aim at securing a sustained yield from all classes of timber, encouraging the most economical utilization of wood and other forest products, and maintaining and improving climatic conditions in the interests of agriculture and water supply. A high standard is thus set which it will be difficult for any government or individual administration to ignore.

The Imperial Forestry Conference proved conclusively the advantages to be derived from an inter-change of ideas by the responsible forest officers and others interested in forestry throughout the far-flung British Em-

relations between the various parts of the empire. Is there any reason why similar but more far-reaching empire. It will undoubtedly result in a clearer recognition of the problems involved, in a more aggressive attempt to solve them, and in the establishment of closer commercial relations? Surely Canada is fully as interested from an economic standpoint in the forests and forest policy of the United States and Argentina as in those of Nigeria or New Zealand. With the steadily increasing depletion of the timber supplies of the world each country is becoming more interested in the forest resources of its neighbors, both near and far, and in the development of trade relations. The United States now imports spruce from Canada and oak from Japan; Brazil imports long-leaf pine from the United States; Great Britain imports mahogany from Mexico; China imports teak from India, and so it goes. Each country is becoming more and more dependent on some other country to meet some particular need, and as a result the forest problem is becoming less local and more international in character. Why then would not a world conference for the discussion of forestry questions of mutual interest be well worth while?

The next meeting of the British Empire Forestry Conference is to be held in Canada in 1923. American Forestry would like to see this followed by a world forestry conference which the United States would take the lead in arranging. It is none too early to begin to consider ways and means of holding such a conference, the ground to be covered, and the objects to be achieved.

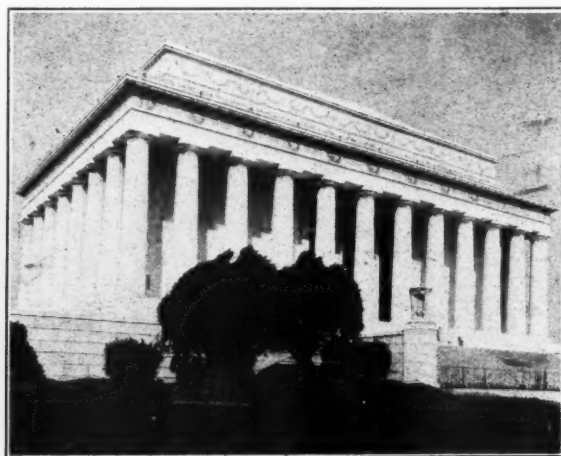
LARGE TREES FOR MEMORIAL PLANTING

When the Arlington Amphitheatre was dedicated the public found placed about the memorial full grown trees. This work had been done by Lewis and Valentine, Landscape Engineers, of Philadelphia. In the laying out of grounds for such structures or for country estates or in any project in which landscaping is a major part of the scheme you do not have to wait for trees to grow. The art of transplanting full grown trees to meet the landscape artist's ideas has become a science in itself.



Underwood & Underwood.

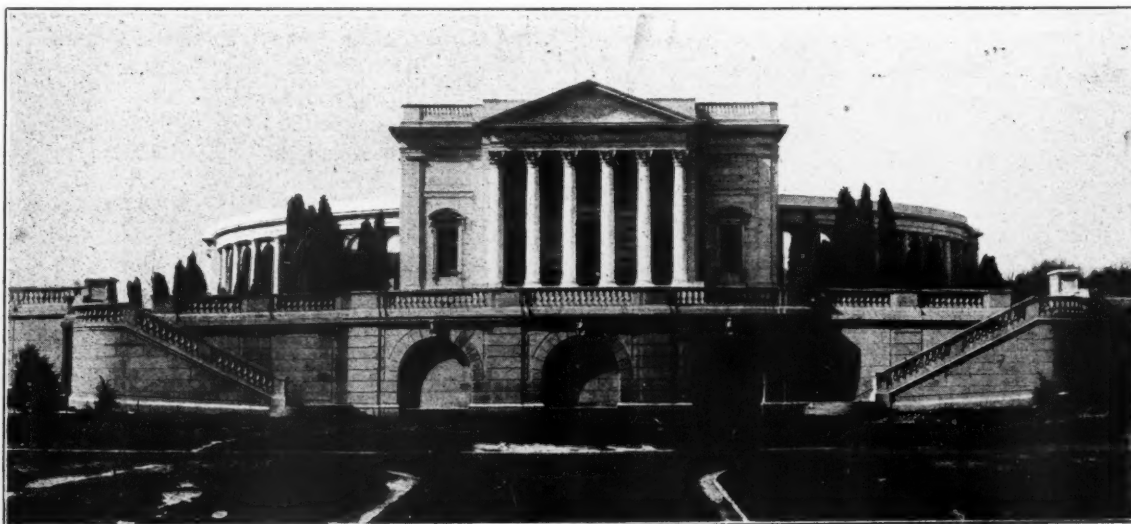
TRANSPORTING ANCIENT BOXWOOD TREES TO
THE LINCOLN MEMORIAL



National Photo Company.

READY FOR PLANTING AT THE LINCOLN
MEMORIAL

In the case of the Lincoln Memorial, old trees from the grounds of Charles H. Heitmuller were moved to their places designated by the landscape architects. The trees formed a part of the Union line of defense about Washington during the Civil War and were moved five miles to the Lincoln Memorial in Potomac Park. The Lincoln Memorial is opposite the Lee Mansion in Arlington Cemetery across the Potomac.



Commercial Photo Company.

THE ARLINGTON MEMORIAL AMPHITHEATRE

VALLOMBROSA FOREST IN ITALY

BY NELSON COURTLANDT BROWN

(PHOTOGRAPHS BY THE AUTHOR)

NEARLY everyone interested in forestry who spends any time in sunny Italy, pays a visit to the State Forests which are scattered in small patches throughout the rugged peninsula. Perhaps the most frequently visited of these forests, on account of its relative accessibility as well as its interesting historical associations and the welcome, cool shade in the warm summers, is the Forest of Vallombrosa. It is as well known and appreciated among European travelers as the well known Forest of Sihlwald, near Zurich in Switzerland, the Forest of Fontainebleau southeast of Paris or the Forest of Nottingham in England.

The Forests of Vallombrosa are within easy reach by motor-car or by train and funicular from Florence in the heart of Tuscany. By motor, it is just 34 miles from Florence and lies over three thousand feet in elevation along the upper reaches of the Apennines, overlooking the broad sweeping valley of the Arno. Not far from Vallombrosa is the crest of the divide with the turning of the waters between the Adriatic to the east and the Mediterranean to the west.

Vallombrosa, within recent years, has become a favorite and well known summer retreat, and for a long time it has been favored in song and story, especially by Milton and Dante who walked its shadowy paths centuries ago. Now, every summer it is the vacation ground for many of the Italian nobility and for the diplomatic corps at Rome. Its great attractiveness lies in the dark, cool silver fir forests with their many highways and woodland walks and the fascinating scenery. There is a great contrast in climate between Vallombrosa lying high in the mountains and the hot dusty valleys during the three warm summer months. In this part of Italy, silver fir grows only at the high elevations. Along the lower slopes are the symmetrically laid-out olive groves, the carefully tended vineyards and the scattered fig and cypress trees, the latter especially to be remembered as

associated with every attractive view of the Tuscan landscape—a pleasant and unforgettable part of every visitor's impressions. Between the olive groves and the forests along the upper slopes are the chestnut groves, of which there is a greater percentage in Tuscany than in any other province in Italy.

It is said that every American tourist who includes Italy in a European itinerary visits Rome, and next to Rome, he is attracted to Florence and its charming environs. From Florence, the Forests of Vallombrosa appear like a dark green blanket on the mountain crests to the east, and from the forest itself one can readily descry, on a fair day, the city surrounded by its villas and cypress-clad hills and the characteristic towers of its ancient cathedrals and palaces.

Conditions surrounding the Italian State forests are comparable to those about our own National Forests. That is, most of them are very irregular patches of forests, some are exceedingly remote from the large communities and transportation facilities, and the forest cover is often in a poor condition. By way of comparison with our extensive National Forests in this country, a much smaller percentage of the Italian forests are owned and managed by the Governmental authorities. Ex-



MONASTERY OF VALLOMBROSA

The old watch tower and guard house at the Monastery of Vallombrosa. Here students of the National Forest School were placed in punishment for breaking school rules.

tensive plans, however, are under way for further regulation of forests now in the hands of private interests, much of which is not being managed according to modern scientific principles of forestry.

The historical associations connected with the Forest of Vallombrosa are very interesting. It was founded in the twelfth century and given its name which, literally translated, means "Shadowed Valley," by Saint Giovanni Gualberto. It was founded as a monastery and retreat for one of the Benedictine order of Monks, and from its early inception, the monk took great pride in caring for, cultivating and replanting the forests. Both the monastery itself and the forests became enlarged from time to

time. The interior courtyard, the bell tower and the watch tower are the oldest sections, while the facade, which the visitor first sees on approaching the monastery was not founded until the sixteenth century. It was used continuously as a monastery until the year 1861, and the colony consisted of about fifty monks. Even at the present time there are two monks associated with



ITALIAN FORESTER'S HOME

A cottage home of a forester in the valley of the Casentino, made famous by Milton, Dante, Keats and St. Francis of Assisi. In the background is the well-known Castle of Poggio, where one of the robber barons held sway during the Middle Ages. This is in the valley east of the forests of Vallombrosa.

the monastery during the summer time and one during the winter. In 1869, the monastery was converted into the Royal Forestry College, which continued at Vallombrosa until the year 1911 when the school was moved to the Cascine Gardens on the outskirts of Florence. One of the most interesting features of the monastery is the old type of kitchen used in the Middle Ages. It consisted of a raised fireplace in the middle of the room around which the monks sat and prepared their meals, the smoke going up through an aperture in the center of the room. It is said that the kitchen was the only really warm room in the whole monastery, and during the winter it was consequently used not only for a kitchen but for general purposes as well since there was ample room to sit all about the fire which was maintained in the center. The old monks' cells were converted into dormitories for the faculty and students of the forestry college, and even at the present time, visitors are entertained in the old cells of the Benedictine monastery. Special cells are now reserved for the annual visits of the Minister of Agriculture, the Director General of Forestry, their staff, etc.

It is a quaint and interesting old place, situated in a deep silver fir-clad gap in the high mountains about Vallombrosa. Although the forestry college was moved

to Florence in 1911, it is still the summer headquarters for this school, that is, from June 1 to July 15 and from September 15 to October 15, when the professional students are given a portion of their field training and it also serves as the location of one of the State supported ranger schools. Before the war, there were 150 students in the ranger school at Vallombrosa, which consists of a one-year course. Most of these students spend three years as forest guards before going to the ranger school at Vallombrosa for final training.

Before serving as forest guards, they spend one year at the ranger school at Citta Ducale in the Abruzzi, near Apulia. On the successful completion of the ranger course at Vallombrosa a degree of brigadier is given them, whereas a few of the very best men are given the title of marshall. On completion of the ranger course at Vallombrosa, the men as brigadiers get 1800 lire, which normally is equivalent to about \$360, whereas the marshals receive 2400 lire, equivalent to \$480. While the



AN ITALIAN REBECCA

An Italian water carrier with her copper vessels and fiascos at a wayside spring. This was taken at a village along the high mountain divide in Tuscany.

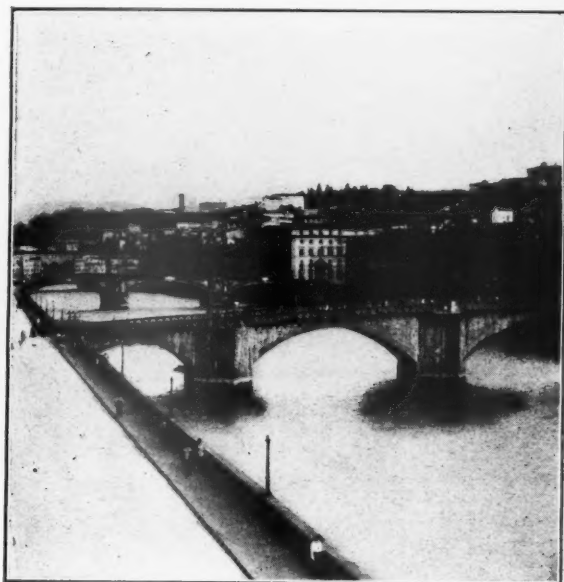
students are at Vallombrosa, they receive two lire extra or about forty cents per day. The professional course students from Florence are always kept separate from the ranger students while at Vallombrosa.

Every visitor to the Forests of Vallombrosa is shown by the local forest officials the shrine of Saint Giovanni Gualberto in the deep fir woods above the monastery, and the story is related of an old legend which tradition has handed down from the past nine centuries. It is said that this sainted monk acquired a great reputation for miracles in healing the sick, etc., and during the course of one of his meditations at his lonely hermitage in the forest he was suddenly confronted by the devil himself. A bitter fight ensued in which the devil was very badly worsted and eventually tossed down a rocky

gorge. An attractive shrine was later erected at this place in commemoration of the saint, and to this day a tablet marks the spot of the bitter struggle. Farther up the gorge above the monastery, an old hermitage was converted during the war into a retreat for orphan children of the war and for children of soldiers serving at the front. These children were brought by the hundreds from the congested cities of the lower valleys. The expenses were met by a fund subscribed by Italians and English as well as by Americans.

The forest itself, the official name of which is "Foreste Demaniale de Vallombrosa" consists of an area of 3500 acres and reaches its highest point at a place called Secchiate at an elevation of 3500 feet. Of this area only 875 acres are of chestnut, 125 acres of three varieties of Italian pines (*Pinus Sylvestris*, *P. Austriaca* or *Nigricans* and *P. laricio*). The remainder of the forest consists of European beech (*Fagus sylvatica*) and silver fir (*Abies*

be cut to best advantage measured in terms of profit as well as for the best interest of the forest itself are as follows. The silver fir is considered mature at from 90 to 100 years of age, the beech at 120 years and the chestnut at 34 and 51 years of age. No pine in this forest is over 40 years of age, it having been planted about the year 1878, and was cut for war purposes as the timber

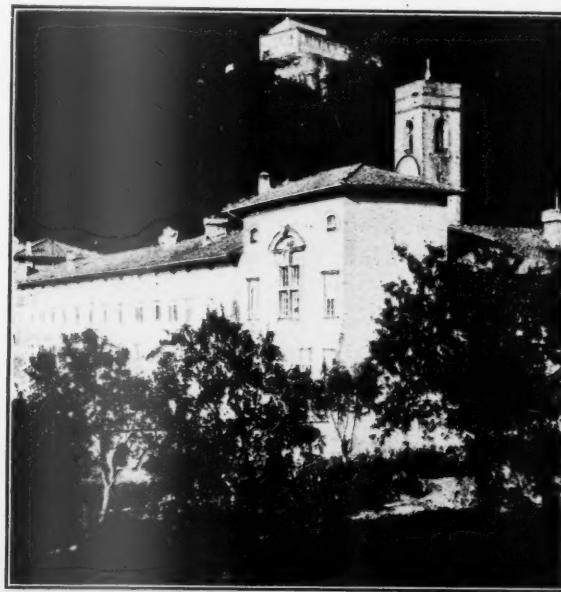


THE PONTE VECCHIA IN FLORENCE

The famous Arno flowing through the heart of the city of Florence in Tuscany. Florence is the starting point for a visit to the forests of Vallombrosa and this river has its head waters along the crest of the Appennine Divide near Vallombrosa. In the foreground is the well-known old Ponte Vecchia.

pectinata). This forest has been under continuous forest management by Italian forestry officials since 1869, and for centuries before that date the monks carefully protected, cultivated and cared for the forest. Much of the timber was mature, having been planted by the monks from ninety to one hundred and twenty years ago and was ready to be cut to meet the great emergency arising out of the Italian war program. With the abnormally large imports of lumber cut off owing to the lack of ships, the native Italian forests were largely resorted to to meet this great emergency and the splendid forest of Vallombrosa, held almost sacred in the hearts of many Italians, was sacrificed very largely for this purpose.

The forestry officials have determined that the so-called financial maturity or the age at which trees can



SIXTEENTH CENTURY MONASTERY

The Monastery at Vallombrosa built in the Sixteenth Century as a retreat for the Benedictine Monks. From 1870 to 1912, it was used as the home of the Royal Italian Forestry College. It is now the headquarters of the Vallombrosa Forest, as well as one of the State Ranger Schools.

was badly needed and the areas are being replanted at once with silver fir, which has been shown to be the best tree for forest management.

The purpose of management of this forest is not only to supply timber, but to maintain the forest as more or less of a summer resort and vacation retreat for those throughout the Italian peninsula. Even where cuttings were made to serve the war emergency, strips were left along the highways and woodland paths so that the impression of devastation and desolation which is so often associated with logged off forests is not present.

At the above maturities, the product of the various kinds of trees was as follows:

The average production of silver fir was 240 cubic meters per acre, whereas the maximum stands ran up to 440 cubic meters per acre. Beech produced 140 as an average, of which one-half was used as fire wood and a maximum of 200 cubic meters per acre. The average pine at 40 years produced 100 cubic meters per acre and a maximum of 140 cubic meters per acre. The chestnut production at 17 years was about 52 cubic meters per acre, at 34 years, about 104 meters, and at 51 years, some 156 meters per acre.

Chestnut trees are chiefly cut at an age of 17 and 34 years because if left to grow to an age of 51 years the

added growth is not justified. It is consequently cut chiefly for vineyard stakes, small poles, etc.

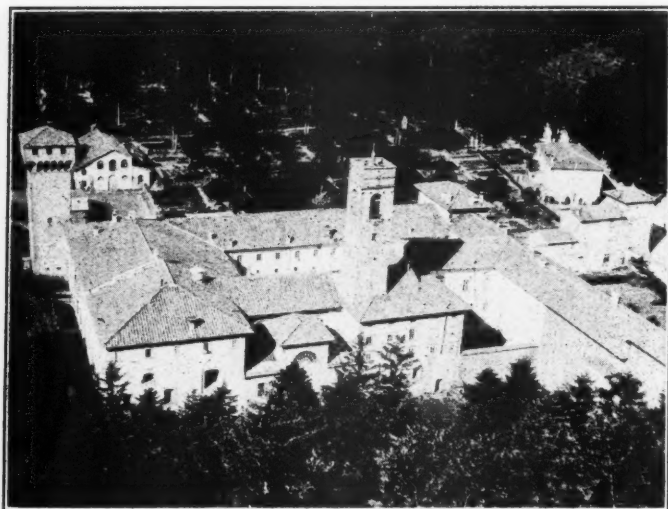
The trees per acre at maturity, are: Silver fir, 160, at an age of 100 years; beech, 160, at an age of 120 years, and pine, 320 to 350 at an age of 40 years. When these forests were planted 1,750 plants were used per

has been closely followed and it is generally agreed that it has been a great success.

Near the old monastery there is one of the most extensive and complete forest aboretta in the world, which is a very interesting and attractive feature of the forests. This was established forty or forty-five years ago so that experimentation in the growth of trees from all over the world has given definite results. It has been demonstrated that under these conditions of climate, soils, etc., over three thousand tree species from all over the world can be propagated successfully. There are a large number of American trees which have reached an excellent size in this time, particularly Douglas fir, white pine, redwood, yellow poplar, concolor fir and Lawson cypress. The Douglas fir is easily the most successful of those planted, among the American trees, but considerable quantities of the Lawson cypress and concolor fir have also been adopted for commercial planting.

California redwoods are commonly found planted in every section of Italy, and they seem to develop splendidly under the conditions of the Italian climate. In Bologna recently a redwood tree over four feet in diameter was cut which had been planted only about sixty years ago. Sections of this tree are now exhibited in the Museum of the Royal Forestry College at Florence.

The heavy cuttings in the Vallombrosa Forests are representative of the condition which prevailed in all of the forests throughout Italy, including not only the State forests but those belonging to the municipalities and private interests as well. To meet the great need for lumber and



MONASTERY OF VALLOMBROSA

A general view over the Monastery of Vallombrosa, Italy, the forest garden in the background and the hotels on the right. This view was taken from far up the so-called "shadowed valley" on a cliff overlooking the group of buildings.

acre for silver fir, whereas of the pine about 100 plants per acre were used.

Before the war, the system very commonly adopted in forest management in Italy was as follows. The silver fir forest being intolerant of shade and even aged was clear cut, that is, all trees were cut off clean and planting followed immediately. With the beech, however, the selection system was followed, that is, individually, trees here and there were removed from the forest as they became mature. The pine was also intended to be cut clean and replanted at once. All of the species are grown in pure stands, that is the fir, beech, chestnut and pine were never mixed together in the same stand. This was done, according to the Italian foresters, because it was believed that the quality of the wood was distinctly inferior when grown in mixed forests. That is the claim made by many eminent Austrian foresters, and prominent Italian lumbermen who have held and operated extensive holdings in Austrian forests are of the same opinion.

The annual normal cut from the Vallombrosa forests was for silver fir, 2000 cubic meters; beech, 2000 cubic meters; chestnut, 1700 to 2000 cubic meters.

In case of the pine, it had not attained sufficient size to produce an annual yield. The net return from silver fir was roughly \$4.00 per acre per annum. From the beech, very little was obtained—only about 80 cents being derived per acre per annum from these forests. The very careful working plan or scheme of management has been devised for these forests by Professor Guiseppe Di Tella. It



MONK CELLS AT VALLOMBROSA

Looking up the highway along the old Monastery at Vallombrosa with its interesting old monk's cells, its decorative lamp posts and the old watch tower in the background

timber of all kinds for the great army of 5,000,000 men at the front, nearly all of the available and mature timber was taken. The famous Forest of Vallombrosa was not spared in this respect. Instead of a normal annual cut of 6000 cubic meters before the war, during the year 1917 and before the end of the year 1918, 30,000 cubic meters of silver fir were cut, 18,000 of beech, 6,000 chestnut and 1,000 pine, making a total of 55,000 cubic meters, which is equivalent to over nine years' normal production in this forest. That is, the future yield for approximately nine years was discounted for the present war emergency, and aside from this the growth to be expected during that time was cut off, so it is estimated by the Italian officials that for probably fifteen years at least no cutting can be made in the Vallombrosa forest.

All of the best silver fir forests, that is, not only those which were actually mature, but those which were approaching maturity were cut off and the material rushed to the front, the silver fir lumber being in especial demand for troop barracks, trench timber and boxes and crating stock for munitions and food supplies. The immature pine as mentioned above was also sacrificed as well as a good share of the better beech, only a small portion of which has reached maturity.

Lumbering in a primitive way had been practiced on the Vallombrosa forests by the monks during the past several centuries. A sawmill had been erected by them, but on account of the distance from the rail-

way, this forest had not supplied an important quantity of lumber, the principal products having been charcoal, vineyard stakes, fuel wood and lumber used locally.

During the war, however, in order to log the trees in a most economical manner, log chutes were erected, and in the steep gulches an overhead cable system similar to



IN THE HEART OF A FOREST

A colony of children being entertained at a little woodland home in the heart of the forest of Vallombrosa. These children were from Florence and Pontassieve and remained for several weeks during the summer of 1918. The fathers of most of them were soldiers in the Italian army.

those used on the high mountain front by the troops was installed for the larger logs in two of the principal valleys.

Aside from these means, oxen were used to bring the logs into the sawmill which was centrally located for the woods operations, just below the old monastery. The average length of haul for these logs was one mile. The logs were usually cut in lengths of four meters or about 13.1 feet. The fir was also cut in lengths of five and six meters whereas the beech was usually cut in two and three meter lengths as well as four meters. When the silver fir and pine logs were to be used for beams and general construction work they were cut in 7, 8 and 10 meter lengths. In all cases, 10 centimeters was allowed for trim in addition to the above lengths, and all logs were usually "nosed" to facilitate logging on the steep hillsides. In all of the woods operations, a policy of clean cutting everything was adopted. After the large logs were taken out, the tops, limbwood, and even the stumps were cut and stacked and used later for fuel wood or charcoal purposes. During the following spring, the area was immediately replanted.

The following costs may be of interest on these operations. It is estimated that it costs from 60 cents to 80 cents per cubic meter for felling and cutting the trees into log lengths. In the case of the beech, the cost usually runs from 80 cents to \$1.00. For transportation one mile to the mill, it cost 80 cents per cubic meter before the war, whereas during 1918, the cost was from \$1.60 to \$2.00 per cubic meter. Each wagon load of



FORESTERS IN ITALY

A group in the summer garden at Vallombrosa. In the foreground is the Signor Bonomini, manager for the lumber company cutting Vallombrosa forests, on the extreme left Professor Di Tella; standing above on left, the director of the ranger school, standing in the center, state inspector, and on the right Signor Camillo Parisini, general manager of the Fratelli Feltrenelli Company of Milan. In the right foreground is Signor Martinetti of Florence.

logs consisted of an average of about one cubic meter or about 424 board feet of lumber. The oxen cost about \$200 per pair prior to the war, whereas during 1918 a pair brought from \$1500 to \$2000.

When the operation was running to full capacity, 60 men were employed in the woods. Altogether, including those employed in transporting the logs there were 220. These men received from \$2.00 to \$2.40 per day, and worked 12 hours. All woods work was done by contract, and when the labor supply became short, military labor was supplied in some cases by the army. The full woods corps of 220 men produced an average of 80 cubic meters of saw logs and fire-wood in one day. All fir logs up to a size that would make an 18x18 centimeter beam were hewn by hand in the woods. Logs from 20 to 23 centimeters in diameter at the top end were required for this purpose, and only silver fir was hewn. All hewn beams had waney edges.

The old sawmill was one of the most interesting features of the forest and it was indeed a busy place during war time. It was originally placed here by the Benedictine monks about 200 years or more ago, and until recent times was operated entirely by a water wheel. This mill had a normal capacity of about 16,000 to 21,000 board feet per day of ten hours. However, when beech was sawed only about 10,000 to 12,000 board feet were cut per day. During the war, the mill ran in two shifts, but frequently on account of the scarcity of labor and the consequent lack of logs only one shift was used.

The mill was built entirely of stone, and instead of the conventional log pond so familiar on our larger operations in this country, a small truck was loaded in the log yard and moved by hand into the mill. The latter was equip-



CLEARED AFTER CUTTING

Cut-over beech forests at Vallombrosa. After the logs are removed, limb wood, tops and brush are stacked up and after seasoning are used for fuel wood and charcoal. After the stumps are removed, the area is replanted at once to silver fir.

waste, including sawdust, slabs, edging, bark, etc. However, in contrast to conditions in this country, none of this was allowed to go to waste. The sawdust was burned as fuel, or made up into briquets, and sold in the neighboring communities. The slabs, trimmings and other edging were converted into charcoal in the sawmill yard, while the smaller edging, bark, etc., were used for fuel purposes. About 20 men and 20 women were employed in the mill and in the mill yard. The sawyers received

\$1.60 per day, the other men \$1.30 and the women 70 cents per day. The working hours were from 7 to 12 in the morning and from 1.30 to 6.30 in the afternoon. The women were served with lunch in addition to their pay by the officials. During the winter time, the water-turbine was resorted to entirely whereas during the summer, owing to the lack of sufficient water flow, electric power from Pontassieve in the Arno Valley was used. A sixty horsepower motor was used for the latter purpose. Silver fir normally was seasoned for about 8 to 10 months before shipment, whereas during the war no regular seasoning was done as the demand for lumber was so



STAKES FOR WIRE ENTANGLEMENTS

Some of the 20,000,000 stakes required annually for barbed wire entanglements at the front during the war. The stakes were collected from points in the Italian forests throughout the peninsula. These stakes were cut from the forests of Vallombrosa and consist of beech, silver fir, pine and chestnut.

urgent it was even used in the green state.

It is estimated that the cost for sawing silver fir before the war was between 70 cents and \$1.00 per cubic meter, whereas it was considerably higher during 1918. The sawing costs, however, were kept down on account of the mill running to full capacity nearly every day and complete utilization of the product was possible.

As noted above, the fir lumber was used for barracks and general war purposes. The best clear stock of beech was used for airplane propellers and for cars, the remainder being used by the navy and for trench timber, railway and artillery purposes, etc.

The lumber product from this forest was transported by motor truck to Pontassieve, the closest point on the railway about twelve miles distant. Six cubic meters of fir or approximately 2,500 board feet were considered a load whereas only four cubic meters of beech or 1700 board feet of this heavier wood was transported in each load. Two round trips were made per day in the winter time and three during the summer when the roads were in better condition.

The consumption of charcoal in Italy has always been very heavy because of its almost universal use for domestic purposes, both for cooking and heating. At Vallombrosa a large quantity had always been made, even in the time of the monks during the Middle Ages. Prior to the war, this forest alone produced annually about 220,000 pounds of charcoal. This forest had always contained a great deal of beech, and up to recent years the only method of utilizing this wood was by means of converting it into



SILVER FIR FOREST IN ITALY

A view over the silver fir forests of Vallombrosa showing the areas of mature forests cut clear for war purposes and the little settlement near the Monastery in the distance. As a summer resort this is a favorite vacation place for the diplomatic corps and government officials from Rome. From the cool forests one can look 2,000 feet below in elevation to the hot, dry valley of the Arno, with its picturesque vineyards, olive groves and cypress-dotted hills about Florence.

inches in diameter. It was seldom possible to have all the sizes of this shape inasmuch as tops, limbwood, chunks of stumps, slabs, and edgings constituted a large share of the material. A level round space about 60

feet in diameter is cleared and the pieces are built up in the form of an obtuse cone. No standard sizes of piles were used, although the usual size consisted of a quantity of forty cubic meters or forty sters. Over the pile is placed earth and sod to prevent too rapid combustion, and the pile is lighted from the outside, a chimney being left at the top in the center to form a draft. The reduction of the wood to charcoal form requires about a week, but this varies considerably depending upon the amount of wood, its size and dryness and the state of the weather. When the wood is of average dryness the resultant charcoal consists of only about 20 per cent of the original weight of the wood and only about one-half of its original size. The charcoal is trans-

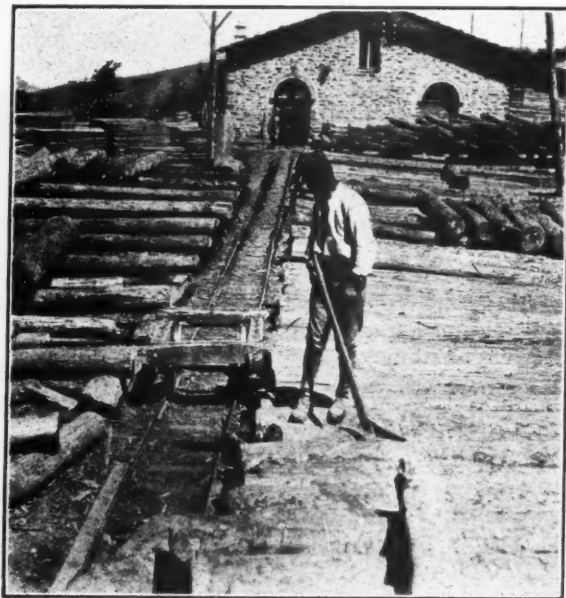


A TWELFTH CENTURY TOWER

The picturesque old bell tower of the Monastery at Vallombrosa. One of the most pleasing and attractive features of the little woodland settlement at Vallombrosa was the periodic ringing of the Monastery bells. This is the oldest part of the Monastery, which was built in the Twelfth Century.

ported by ox-carts or by motor truck to the railroad. The average load in the case of a motor truck is three tons. Years ago, charcoal was transported to market entirely on mule back, each mule carrying a sack of one quintal, which is equivalent to about 220 pounds. The slow moving of a few mules, each with its heavy load of charcoal on its back, is a common sight even today throughout the mountainous sections of Italy.

Prior to the war, this charcoal brought about two dollars per quintal of 220 pounds, whereas during the fall



THE ANCIENT SAW MILL

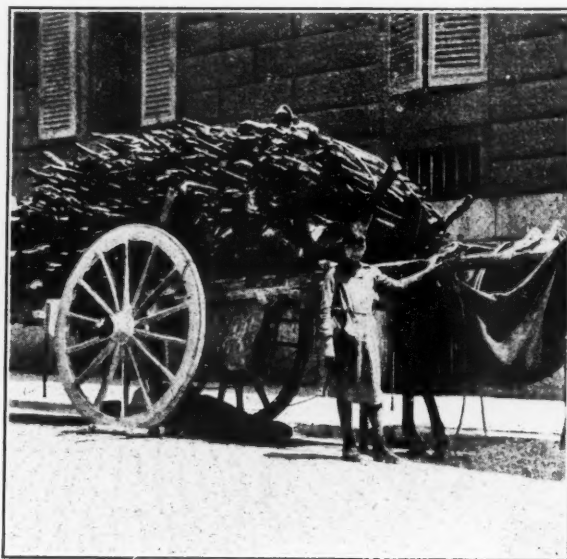
Log yard at the old saw mill of Vallombrosa. This saw mill was established by Monks of the Benedictine Order several centuries ago and is still in operation. In the winter when the water supply is sufficient the mill is driven by direct water power, whereas in summer by electricity furnished by a large power plant near Florence.

of 1918, it was bringing \$8.00 for the same amount. In all of the above values, the normal rate of exchange, that is, approximately five lire to the dollar, has been used. During the war, the rate of exchange fluctuated so greatly that this is the only fair basis for arriving at approximate values.

A great deal of experimental work in the replanting of the Italian forests has been carried on at Vallombrosa. Seven excellent nurseries, comprising about 20 acres, have been developed, and they have an annual capacity of about 1,000,000 plants. However, a good portion of the area is devoted to experiment stations so that is not a fair estimate of its total productive capacity. The principal results of their experimentation is that silver fir has been demonstrated to be the best tree for planting on their higher mountain levels. It is especially desirable on account of its rapid rate of growth, ease of planting, freedom from insects and other diseases, the high quality of the wood produced and the fact that it will grow in dense stands and to large size, that is, it continues its rapid rate of growth up to an age of ninety to one hundred years. Norway spruce has been tried as well as European larch and other species, but they have

not proven to be nearly as successful as the silver fir.

The general practice is to retain the seedling in the seed beds for two years, after which they are transplanted into so-called transplant beds for a period of three years. It is estimated that these five year plants cost \$1.20 per thousand to grow under normal conditions, prevailing before the war. It costs from \$4.00 to \$4.80 for planting alone so that the total cost runs from \$5.20 to \$6.00 per thousand for the total cost of reforestation. The plants are placed in the cut-over forests or in the open field one and one-half meters apart each way, whereas pine is planted two meters apart each way. Rectangular planting such as we use in this country is not used in Italy, the alternate method—making each tree an equal distance from every other tree being used. Planting is done both in the spring and fall of the year, but for general purposes, spring planting is considered the best. March and April are considered the best months, whereas in the very high elevations, on account of the frosts, planting is done sometime as late as in May. When



CORD WOOD IN ITALY

Delivering cord wood in the city. The two-wheeled cart is the usual form used for delivering fuel wood and this was a common sight in all of the Italian cities during the war. Prices of from \$30 to \$50 per cord for fuel wood were received during the year 1918.

chestnut is planted it is also placed two meters apart. Beech has been regenerated entirely by natural means, but the Italian forestry officials are planning to cut all beech off at maturity or before and reforest with silver fir. As the young trees develop the plans of management call for an improvement cutting, that is to weed out the more defective and inferior specimens and give the better trees an opportunity for greater development and growth.

OREGON'S SLOGAN CONTEST

THE following slogan was awarded first prize out of a total of 1,150 submitted, in the recent fire protective slogan contest in Oregon:

"Lumber, fuel, beauty, joy,
Forests furnish, fires destroy."

PROGRESS OF FORESTRY IN CHINA

BY JOHN H. REISNER,

DEAN OF COLLEGE OF AGRICULTURE AND FORESTRY, THE UNIVERSITY OF NANKING

THINK the best evidence that interest in forestry in a practical way is increasing in China is the large number of hsien magistrates, agricultural societies, agricultural and forestry companies, and other individuals who have bought either seeds and seedlings for nurseries, or trees for forest planting this last spring from the various forestry stations and institutions from which they could be purchased. It is interesting to note, and it argues well for the future, that forestry in China seems to be developing from the bottom upwards, from the lower and smaller political units to the higher and larger units, with the Central Government doing practically

the Central Government takes hold of the problem, but that can and will function independently in the meantime.

I have not been able to gather complete data except from Mr. Soong Ding-moo, of the First Provincial Forestry School and the University nurseries, but between the two, seeds and trees were supplied this last spring for nurseries or forest planting, mostly for nurseries, to 159 district magistrates, agricultural societies, companies, experiment stations, and individuals. In addition to these, the "Educational Forest Enterprise," which I shall mention again later on in more detail, supplied seeds and trees to the amount of about \$2,500, and the Yangchow

影撮樹植山洞龍小在員職關機各同率屈長省東山年九國民華中



CHINESE NOTABLES ENTHUSIASTICALLY PARTICIPATE IN ARBOR DAY PLANTING

The College of Agriculture and Forestry, at Nanking, is doing laudable work to accomplish the reforestation of China's deforested hills. Due mainly to the untiring zeal of D. Y. Lin, a graduate of the Yale Forest School, Arbor Day in China is now practically an accomplished fact. It was celebrated on April 5, 1920, and the above photograph was taken just after the Arbor Day ceremonies. Mr. Lin is seen standing near the center of the picture, and a little in front of him to his left is the Governor of Shantung.

nothing at all. This is in marked contrast to forestry in Western countries, where the work is usually carried on by and is dependent upon the Central Government. One has frequently heard the criticism that there can be no hope for forestry in China until the Central Government takes hold, organizes, and provides an adequate budget for the prosecution of the work on a national scale, and until national laws can be passed and adequate administration provided guaranteeing protection to those who plant trees. I do not believe this is true. From what I have seen and personally experienced, I believe that in and through the smaller government units and semi-political agencies, such as agricultural societies, forestry can be placed on a good working basis—on a progressive basis, that naturally will be greatly strengthened when

nurseries, probably the largest private nurseries in the province, if not in any province, which have a capacity of several million seedlings, are reported to have had a good year's business. Seventy-five per cent of the seeds and trees supplied by the First Provincial Forest Station were distributed within the province. Only about 12 per cent of those sent out by the University nurseries stayed in the province, while eighty-eight per cent were distributed in Anhwei, Honan, Chihli, Shantung and Chekiang, in the order of importance named. This is an entirely new development, and with education, demonstration, and experience will rapidly increase.

The First Provincial Forestry Station of Kiangsu, situated close by the famous Ming Tombs at Nanking, was established in 1916, by the Provincial Department of In-

dusty, with a budget of \$6,000. This was increased to \$20,000 during the first year, under the present director, Mr. Soong Ding-moo, a graduate of the Philippine School of Forestry, and to \$27,000 the second year. The station has under its control and supervision two sub-stations, where large planting operations are being carried on. The central station has about 1,100 mou of land, a good part of which is in nurseries. Last year, the central station raised in its nurseries 1,800,000 seedlings, and had 1,200,000 transplants, or a total of 3,000,000. The Mo Fusan sub-station contains almost 20,000 mou of land, and by the end of this season will be entirely reforested. The second station is at Pao San, where

of land (over 100,000 mou) just northwest of and across the river from Nanking and west of Puchen. Funds to carry on the work are provided from a small proportion of the budgets of certain provincial schools. Extensive nurseries are maintained, which not only furnish their own planting stock, but from which they sold this past spring, as noted above, \$2,500 worth of stock. The forest planting which they are carrying on is the largest in Kiangsu province, and ranks high among the very largest in any part of China. This spring already they have planted several millions of trees. The work is under the supervision of Mr. Y. Chen.

Large nurseries have also been started this year by the



AN ANCIENT CHINESE TREE

Said to have been planted by Emperor Yung Lo (1360-1424), this ancient ginkgo stands in one of the courtyards of T'an Che Ssu, a monastery in the vicinity of Peking, built 400 A. D.

considerable planting has been done on several of the more important dykes. Young trees are not only produced at these stations for the government's own use, but for sale and distribution. Tree seeds for nurseries and young trees for forest or nursery planting have been supplied as follows, this year: In Kiangsu province, to fourteen district magistrates, twenty-three agricultural societies, twenty-four other agricultural or forestry establishments, and twenty-nine individuals. Outside of Kiangsu province, supplies were provided for eighteen agricultural and forestry establishments and sixteen individuals.

The Educational Forest Enterprise was established in 1916, and has secured a very extensive mountainous tract

Peking-Hankow Railway at Huang Shang Pi (station), Honan, under the direction of Mr. Ngan Han, formerly co-director of the Forest Service organized in 1916 in Peking, but later disbanded. This is more or less of a private enterprise on the part of this Government Railway to make provision for its own supply of ties and other timber needed for construction and repair work. It is a wise and commendable undertaking on the part of the railway, and I understand some agreements in this connection have been negotiated between the Ministries of Communication and Agriculture and Commerce, looking forward to the extension of such work.

The Lung-Hai Railway has also started a large nursery at Chengchow, Honan, looking forward to a future

permanent supply of timber to meet their needs. The work is under the care of Mr. J. Hers.

The Tcheng-Tai Railway, which connects the capital of Shansi province with the Peking-Hankow line, started a nursery and reforestation work several years ago in order to furnish certain of their equipment supplies.

Governor Yen Hsi-shan, the able and progressive Tuchun of Shansi, this spring distributed 350 pounds of *Robinia pseudo-acacia* (black locust) seed for nurseries throughout the province, as the beginning of an extended forestry policy which he is inaugurating.

The Kiangsi Provincial Government carries an annual budget of \$20,000 for forestry work and has three forest stations, one at Kuling specializing in tea and Tung-yu, one at Tungting Sz specializing in Tung-yu, and one at Fu Kuo hsien, devoted to forest plantings.

In Chekiang, a number of leading citizens have organized the "Yuin Yao Company" with a capital of \$80,000, and fully subscribed, and being paid in at the rate of 10 per cent a year, the annual payments of \$8,000 being used for forestry work, mostly planting. This large company was an outgrowth of one of Mr. D. Y. Lin's lecture trips to Hangchow at the invitation of Governor Treh. Mr. Y. Chen, who is managing the Educational Forestry Enterprise is also directing the work of this company.

The colonization work which Mr. Joseph Bailie (now



A MAGNIFICENT AVENUE OF PINUS BUNGEANA



A BEAUTIFUL SPECIES OF THE PINE FOUND ONLY IN CHINA

Dating back to the Eighth Century, this wonderful pine stands at Chieh Tai Ssu, in the courtyard of a monastery, and the beautiful avenue of these remarkable trees, seen at the left, is found at a temple-mausoleum near Peking. This is said to be the finest avenue of these pines in China and consequently in the world, as the species is found nowhere else.

on colonization work in Manchuria) started on Purple Mountain at the time of the last famine, in 1912-13, has developed very largely into afforestation. This past spring (1919), about 700,000 trees, mostly pines, were planted out by the Colonization Association. A large part of this famous old mountain is now planted with trees, and is beginning to show "green" instead of its centuries-old "brown." With its favorable location along the Shanghai-Nanking Railway, where it is seen by thousands of passengers, daily, and as the trees grow larger, Purple Mountain will become increasingly important as a practical demonstration of what can be done with many thousands of mountains similar to it.

In addition to the teaching work of the College of Agriculture and Forestry, extensive nurseries and a seed department are being developed. Both nursery stock and seeds are sold as cheaply as possible. Material was furnished, this last spring, as noted above, for thirty-four nurseries under Chinese direction and six under foreign direction, the latter mostly in connection with mission schools. In addition to seeds about 300,000 seedlings

were sold. This spring's nursery planting is treble that of last year.

The afforestation work commenced by the Germans at Tsingtao and which is being carried forward by the Japanese is probably the largest piece of forest planting as yet accomplished in China.

In Chekiang and Kiangsi there is one forestry school each, of middle school grade. In Kiangsu, some forestry



ANOTHER VIEW OF THE ANCIENT GINKGO

This gives a good idea of the dignity and beauty of the old tree as it stands in the monastery courtyard, the massive trunk and base of which is shown in an accompanying illustration.

is taught in the First Provincial Agricultural School (middle school grade). The University of Nanking, through its College of Agriculture and Forestry, offers a college course of five years in forestry. This latter is the only college-grade forestry school in China, and from its beginning has received support from a number of provincial governments, as well as the Central Government, and the Forestry Fund Committee of Shanghai.

The above evidences of progress along practical forestry lines are only those that have come to my notice. There are doubtless others, but these are sufficient to show the increasing interest in this work. The actual

results, in point of all the work that is waiting to be done are relatively small, but in view of what was being done but five years ago, they show a tremendous progress both in interest and actual work accomplished.

"As of possible interest to your readers," writes Forsythe, the Sherfesse, Forestry Adviser to the Chinese Government, from Peking, China, "I enclose four photographs, two each of rather remarkable specimens of *Ginkgo biloba*, and of *Pinus bungeana*. The Ginkgo is well known abroad, where it has been successfully introduced. Its special interest is not only in the rare beauty, form and delicacy of its foliage (whence its name in English of "maidenhair tree"), but also in its remote geological antiquity. You are familiar, of course, with the successful use which has been made of it in Washington for street and park planting. It survives naturally only in the Far East and even here (with one possible exception, reported by Meyer) is confined to graves, temple grounds and gardens. The Chinese name, *Pai-kuo shu* ("white fruited tree") is derived from the appearance of its fruit, the kernel of which is said to have medicinal value and is extensively used by the Chinese as an ingredient in soups. The Ginkgo is said to represent the sole surviving link between trees and ferns.

"*Pinus bungeana* is much less known to the outside world being restricted to a very narrow habitat in northern China (principally in Central Chihli, the province in which Peking is situated, and in a few places in the neighboring provinces). It is one of the most remarkable of all trees on account of the dazzling whiteness of its bark, a feature which renders it wholly and strikingly unique. In addition, its form is graceful and picturesque, and its foliage unusually delicate. As in the case of the Ginkgo it occurs naturally rarely if at all, but is extensively planted around grave-mounds, in temples and in gardens. It is known among foreigners as the "white-barked pine" or else as the "white lace-barked pine," the latter on account of the delicate lace-like tracery left on the trunk as the outer bark peels off. But above all, it is the extraordinary whiteness of its bark to which it owes its high interest—a whiteness as though it had been newly white-washed or carefully painted."

FAMOUS TREE SUCCUMBS TO OLD AGE

AN Associated Press dispatch from London says that a famous old mulberry tree in North London under which 144 years ago it is said the American Declaration of Independence was first read in England, has fallen under the weight of its age.

American Boy Scouts attending the International Scout Conference there visited the tree only a few days before it crashed and its history was told to 300 of them, who had their photographs taken beneath its branches.

The tree stood on one of the lawns of the Mildmay Conference Hall. Many religious leaders have addressed meetings in its ample shade. Hundreds of requests for chips from the tree are being received.

FOREST RECREATION—THE MIGHTY ROCKY MOUNTAIN TROUT

BY S. E. DOERING

At the end of the season it is right that stock should be taken of resources which go to make up any activity. In the field of recreation the most active time of outdoor play is in the summer and fall. Especially in the fall of the year the fact is brought home to people closely in touch with recreation out of doors that we are fast losing some of the recreation values found in the wild life of the forests. Open seasons are depleting ranges that are now under-stocked with game and a terrific demand for fishing is reducing the fish population in certain streams to a point where years will be needed to bring back the former conditions. It is proper then that this number of "American Forestry" have in the Department of Forest Recreation a discussion of these problems when they are still fresh in the minds of all recreation users of forest lands. Game and fish play a very important part in all recreational use of our forest lands and the Nation today is facing a big problem in preservation and propagation so wild life of forest areas may continue to be one of the attractions which lure people to the woods, lakes, peaks and canons.—Arthur H. Carhart, Editor, Recreation Department.

"LESS go campin'."

"Pa" spoke the magic words which set Billie's heart a-flutter and brought a glad smile to the wan, tired features of Mother. Pa needed a new suit—everybody knew that but—he "guessed the money would go for gas and a new tire" for that ever dependable family servant—"Tin Lizzie."

That night, well toward wee hours, the kitchen table was cluttered with poles, "flies," and much tangled line while Pa and Billie, between tasks, waxed enthusiastic and caught bigger and bigger ones, bringing to silent mother a waft of air from cool, cloudless, azure skies; projecting on the screen of her memory a delicate picture of flowers growing amidst rocks where haughty pines stood constant guard; of rippling waters and golden sunshine; songs of twittering birds, and timid, wondering wood-dwellers. Best of all there was Peace—a harbor of rest far removed from the turbulent sea of humanity.

Where away? That was a mighty question, one which they debated far into the night for, "whoever, anyway, ever heard tell of going camping where there was no fishing?"

It was a problem because, today, there are so many places depleted of stream and forest life that it is difficult indeed to find the "heart's mecca."

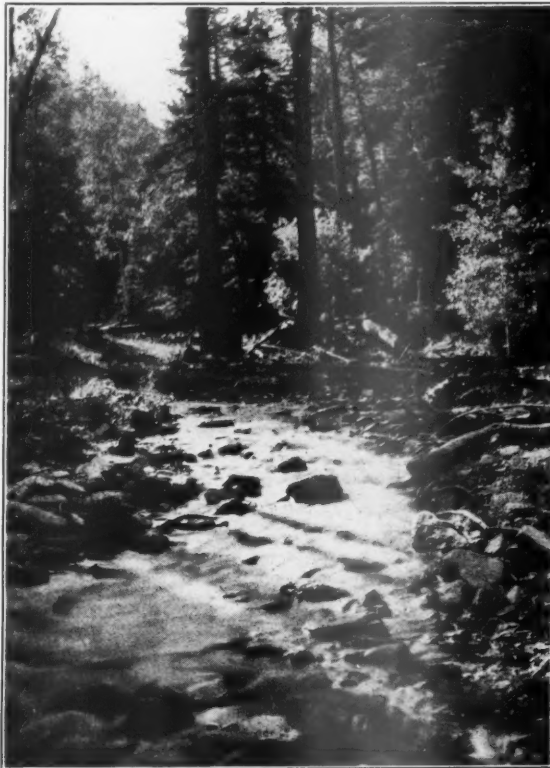
Fifteen years ago the streams and lakes of the Rocky Mountains abounded with leaping, black-spotted trout. While in their native state they are not overly prolific, there were many, very many, in those days. Today, the

fisherman faces a far different problem—a serious one. The streams and lakes are being depleted at a rate that not only astounds the native mountaineer, but places him in a situation which may be met only by herculean efforts on his part if the former status of nature is to be maintained. It is up to him to solve this problem:

The stocking of all lakes and streams with young fish in such manner as will insure a constant supply without exceeding the capacity of the waters. In this, he will meet the enormous demand of our continental public that the "Tin Lizzie" (with due respect to all other utility claimants) has placed within reach of the mountains. This scope, you will doubtless agree, includes all of the United States.

Fifteen short years have brought changes here that are staggering in their magnitude. The Federal Government, the Forest Service and co-operative citizenry have built thousands upon thousands of miles of auto road into the farthest reaches of forest and mountain. Then, there was only the bounding deer and crag-loving Big Horn in a wilderness of solitude. Now, there is a constant stream of travel in luxurious autos; people a-foot; people on horse. Every-

where it is people, people. Where there was nothing before but solid rock walls and impenetrable forests, the Forest Service has built hundreds of miles of beautifully engineered trails that the most timid may travel in safety. Today, fishermen are tangling lines and quibbling over a small trout in waters that, ten years ago, seldom felt the swirl of a line. There are tent-pins,



FIFTEEN YEARS AGO THE STREAMS AND LAKES OF THE ROCKY MOUNTAINS ABOUNDED WITH LEAPING, BLACK-SPOTTED TROUT, BUT WHILE THIS STREAM IS CAPABLE OF SUPPORTING MANY FISH, IT IS BARREN NOW

crude stone fire-places, and dried "bough-beds" in uncounted numbers where before only a coyote paused now and then to yap in his nightly prewl.

In the last five years, cabins—summer homes where people will come to live a few weeks each summer, have leaped into existence by scores. Small colonies and "all summer" camps have sprung up in most romantic and remote regions where the ring of an ax was unknown lest some native blazed his way into mountain meadows where he might keep a flock of sheep or herd of cattle. All this has come about through public clamor for play and recreation grounds. The car was the basis of the invasion it alone made possible. We cannot decry the great American public their

God-given impulse to clamor for and demand beauty, rest, peace, and recreation. It is as natural that people play as it is natural that cub bears frolic. A wise Creator touched the soul of each of us that we might crave these things and have them. They are a bath for the soul that might otherwise warp and narrow in the conflict of human existence.

Therefore, we of the mountains would say to you: "Come, it's your playground—your haven of soul-rest." The mighty mountains must ever remain the Vacation land of America's democratic populace. God meant it so; so be it.

The folk of the mountains and Forest Service have been entrusted with the guardianship of this priceless treasure. You of the north, the east, the south, the west, should know and realize that the task is one of stupendous magnitude. Perhaps you will grasp its enormity when I tell you

that there are just a few thousand Forest men to keep the streams free from pollution, keep them stocked with fish, keep the forests abounding with natural life for the benefit and pleasure of yourself and posterity, maintain the endless miles of road and trail, and preserve the

timber that is fast becoming our most valued asset.

In this gigantic garden which you have given these Service men to protect, 115,000,000 people are entitled to come and play whenever they may choose; there is no feature closed or forbidden. In caring for all this, the Service has to depend upon very limited funds allotted us by an austere and solemn Congress. These men do not criticize Congress. Congress must feel the pulse of the whole nation and must prescribe accordingly.

They work on with the hope that the American citizen will, before long, come to a fuller realization that the Forests need his earnest co-operation and fore-thought.

Time and space forbid that I go into the many phases of this work with which the Forest Service is entrusted.

I can tell you here, very concisely, of one phase of the work; one very essential and necessary phase of which little is known or practiced at present, namely, fish culture.

What is fish culture? It is a term applied to the art of raising fish from the egg or "spawn" to the marketable product. Why the need for fish culture? Because the trout family in

their natural environment and habit, do not reproduce sufficiently to meet, anywhere near, the fast increasing and already enormous demands of the public.

There are three species of trout living within the higher reaches of the Rocky Mountains; the native, the

While this number of "American Forestry" is in the printing or being carried to you in the mail, men will be standing hip-deep in icy water netting fish from which eggs will be taken and sent to the hatcheries so some years hence you or your friends may angle in some trout stream with a reasonable chance of having a tussle with a member of this season's hatch. At this season when most people seek a cozy fire-side these men who love the work are active under the most trying weather conditions. Mr. Doering is the possessor of first-hand knowledge of how fish are raised so they may lure some fisher-sportsman to a forest vacationland. Few people realize the rigors of carrying on this raising and planting of trout. In this, the writer sketches briefly the methods followed and barriers overcome. It is of interest to every recreation user of every forest land and carries information of value to all.—Arthur H. Carhart, Editor, Recreation Department.



AFTER ALL, THEIR'S WAS AN INGLORIOUS END—BUT USEFUL. LET US HOPE THAT THEIR SPIRITS HAVE PASSED SAFELY TO THEIR HAPPY SWIMMING GROUNDS

rainbow and eastern brook. The native is so-called because of its having been, as its name implies, native to these waters. The other species have been "planted" here from points east and west. The native is usually the smaller of the three species and more wiry; penetrating farthest into mountain fastness-headwaters. He is

also the greater fighter, or "game fish," of the trio. Following him closely in "game" spirit is the rainbow which, however, grows faster and heavier. Third is the eastern brook, more content to be lazy, take the world with a smile, wax fat and grow a pound a year in waters containing foods suitable to his not at all discriminating



WHEN TRAPPING IS NOT READILY ACCOMPLISHED—AND IT IS SOMETIMES RATHER DIFFICULT, THE OLD TIME SEINE, OR DRAG-NET, WILL PROVE QUITE EFFICIENT

appetite. Hog-like, he feeds on most anything. Generally he is found in stiller waters where no great effort need be expended in collecting vital necessities of life. Very often, when found in high, cold waters, he will bite quite snappily and occasionally put up a game fight. The native and rainbow remain the choice of the mountaineer.

They are far more venturesome, are inveterate explorers and discriminating in their food. They are, so to speak, quite American.

All three trouts belong to the salmon family and generally bear the salmon color. In a day's fishing one will often find a variation in color from light red to a very



IT IS HIGHLY IMPORTANT THAT EVERY BARREN WATER BE STOCKED, AND THIS IS ONE OF THE FIRST STEPS IN THE .PROCESS. NETTING THE FISH WITHIN THE TRAP TO BE STRIPPED FOR "PLANTING"

dark red. This coloring is due to water temperature and character and quantity of food available and not at all to sex or species as a great many people believe. A fish taken from one water to another will, in all likelihood, change color of meat. I would say that the redder or darker the meat, the more healthy and nourished the trout.

In waters where there is an abundance of feed, a minnow trout will make an average growth of seven inches



STRIPPING THE FISH FOR ARTIFICIAL HATCHING. THIS SHOULD BE DONE ONLY BY SKILLED OPERATORS, FOR WHILE IT IS SIMPLE, THE FISH MUST BE HANDLED VERY QUICKLY AND CORRECTLY IN ORDER TO SAVE THEM AND SECURE THE MAXIMUM NUMBER OF EGGS

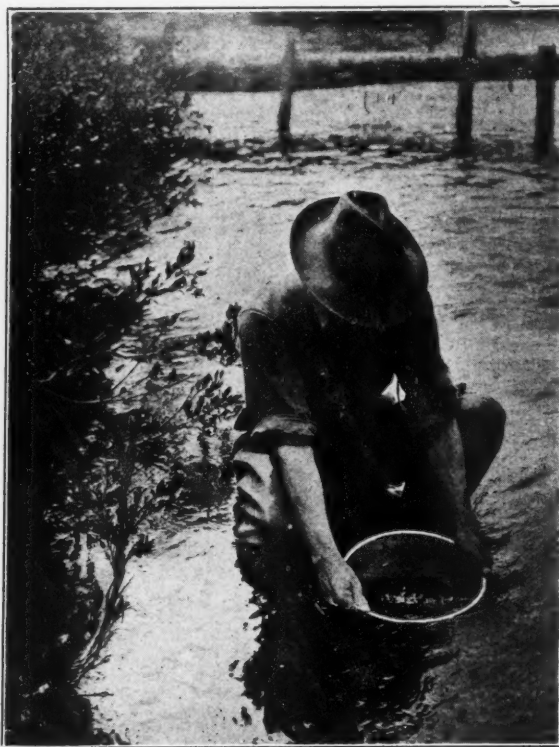
in two years, most of the growth being made the second year. If he continues in good waters a period of five years, he will test the strength of your rod and tax your skill to the utmost. He will doubtless cause you to tell that old, old yarn about the "big one" that got away. Your friends will wag their heads ominously and perhaps the minister will call to expostulate the need for more regular attendance at church.

The trout abounds and thrives in waters varying in temperature from 45° to 55° Fahrenheit. Cold! Yes, it's cold. Just consider a moment that his body temperature is around 45° lower than that of the human body and you will realize that cold water is very essential to him. It must be more than cold, it must be clear and uncontaminated and running freely all the time.

Trout demand a great deal of oxygen and they find a sufficient quantity only in fast moving, tumbling waters. The motion of the water keeps it aerated and charged with this element. Ask any old fish raiser what a trout lives on and he will tell you—"air."

A trout placed in a bucket of water will live only until all the oxygen is exhausted. An hour will render him torpid, in less than two hours he will be dead. For this reason, trout placed in brackish or sluggish waters with a temperature of 65° or greater, will not survive. Not much space can be given here to the food of the trout although it is a matter of utmost importance and one which must be thoroughly understood before one embarks upon the troubled sea of fish culture. The known "good waters" are all gone, but there are many remaining barren waters that must come under cultivation through some means or other.

It must be understood that the trout does not feed upon plant life, he feeds upon the insects which cluster



IN ARTIFICIAL HATCHING THE "MELT" IS THOROUGHLY MIXED WITH THE EGGS BY PLACING BOTH IN A SHALLOW PAN CONTAINING WATER AND GENTLY MIXING THE CONTENTS BY ROTATING THE PAN

upon and feed upon plant life. Now, to introduce the species of plant life which will in turn collect the certain species of insect life conducive to the life and well being of the trout, is a field of study that is almost wholly unexplored, yet every fish man will tell you that it must come to pass before we can materially increase our fish supply. The trout, I regret to say, is cannibalistic, feeding upon its own kind when necessity compels and in numerous instances when necessity does not compel. The

absence of small fishes or minnows along the thin water of streams and in the inlets, is a pretty good indication that the waters do not contain enough plant life to keep the older fish in good condition. Thus, in stocking the streams with young fish, or "fry" as they are known, it is necessary to exercise great care and no little skill in the selection of waters.

The various State and Federal hatcheries are engaged in producing fry, not in raising them. From the time the little fellows leave the hatcheries until they are freed in the waters, they receive divers kinds of bad handling. Usually it is up to the citizenry to see that they are planted. Too often these tiny fish are taken and dumped into the waters headlong where they come suddenly in contact with an entirely different temperature and surroundings where there is, possibly, no feed at all. The consequent loss is easily apparent.

In the ordinary season the rainbow trout will begin laying eggs as early as April 15, continuing until as late as May 15, depending upon the elevation of their waters and climatic conditions. The native follows closely here, spawning from May 15 to June 15. The eastern brook delays spawning until late fall, some-

times extending the operation well along into December.

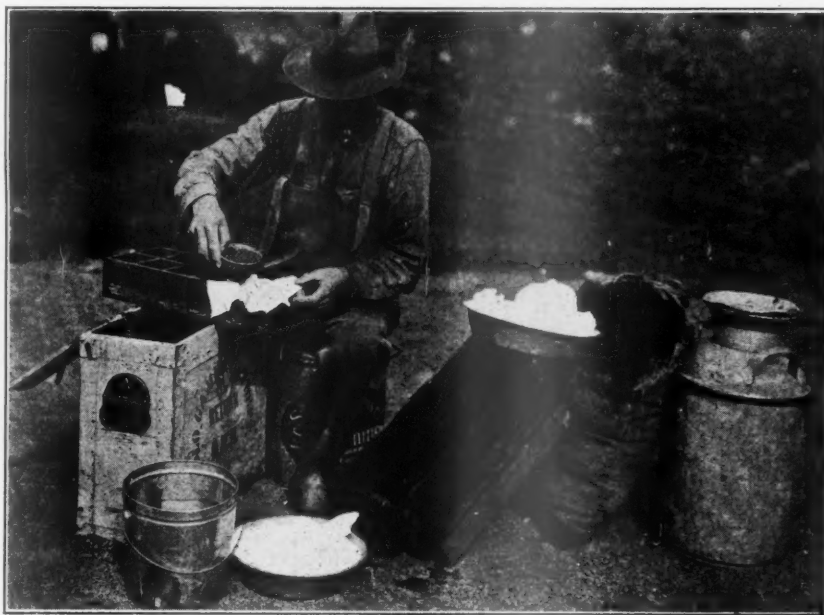
The procedure in natural spawning is the same with all three species. The female will settle somewhere in shallow water where there is sand and slow moving bits of moss and water slime. At a selected spot she sets her fins in motion with the result that, after a time, a small hole is made in the sand, mud, and bits of moss, in which she will deposit a few eggs. The action is called "fanning" by local men. Trout eggs are not adhesive, hence a few may be laid at each fanning point.

After depositing eggs the female will depart, whereupon a male fish will pause over the fanning nest, depositing a quantity of white, slimy substance which fertilizes them. This done he will fan awhile in order to slightly cover them with bits of moss and slime floating about in the water. It happens though, quite often, that this knightly male will eat the eggs, fan until he has made

his deposit in the empty nest, then hie away to other fields of conquest. Should, however, the eggs be properly fertilized and covered, there may be many things yet happen them. The water may raise and wash them out, or it may recede and leave them on dry land, or diving birds or snakes may eat them. There are a hundred and one things that may happen to the eggs in course of incubation and something generally happens. It is doubtful if one per cent of the naturally laid eggs produce minnows that reach maturity. Reproduction of the trout is a complicated affair for which nature did not provide very carefully.

Hatching of trout from eggs is a process covering about three months' time. The method of incubation in artificial state is the same as that in natural state except that artificial hatching is made highly successful

through the removal of natural enemies and barriers encountered in natural incubation. In studying the artificial method of hatching, it will be readily seen how almost impossible it is for eggs to hatch successfully in native state. The eggs are very tender, being composed of an amber colored liquid. They are round and about one eighth inch in diameter. Any



BEFORE THE EGGS ARE FERTILIZED THEY MAY BE SHIPPED IN CRATES. NOTE THE SNOW AND ICE IN THE PANS WHICH WILL BE USED IN KEEPING THE MOSS COOL AND WET WHILE THE EGGS ARE IN SHIPMENT

sudden change of temperature, any rough usage, any abrasion will almost surely result in their loss. Then, following this chance, there is a disease, or animal life, very contagious, which is attacking them constantly. Infection on one egg will spread rapidly to all eggs in connection in the fanned hole where native hatching is taking place. Just how this feature is overcome in the hatcheries will be explained later.

During spawning time the male and female fish will crowd into inlets of lakes or follow up the streams in search of suitable hatching grounds that the rough deep waters do not provide. In spawning they "swarm" so to speak. Man has discovered that, in this period, they may be easily trapped and stripped of their eggs. By going up the stream a hundred yards or so above a lake, or into the reaches of some stream where it traverses a meadow-like country in which the fish gather, traps may

be built quite inexpensively of strips of lumber set perpendicularly in the water and about an inch apart. This allows the smaller fish to continue their way up the stream and keeps back only the larger, which are the most valuable from a productive point of view. A similar fence is then constructed at the entrance with a triangular shaped hole provided where the oncoming fish may enter. During the day the trap is closed and the fish stripped in turn and thrown into the waters above the trap, thus preventing them from mixing with those awaiting stripping. Usually the trap is left open at night and the catch "worked" the day following.

Trapping as described above cannot always be reverted to. In many instances, generally in lakes, it is necessary to adopt the old time seine or drag-net if the fish are not gathering at some inlet. A description of this method is not deemed necessary since almost anyone knows how to operate a seine.

Stripping consists of holding the fish by the head in the right hand, belly and tail downward over a pan in which is a small quantity of water. The fingers of the left hand close round the body of the fish in such manner as to massage the belly until the eggs have been ejected. When ready to spawn the trout is very sensitive, and a slight touch will often cause them to eject one or more eggs. The stripping, while simple, should be done by some one skilled in the operation since the fish must be handled rapidly and correctly in order to get them back in the water before harm has resulted and obtain the greatest amount of eggs possible. A new operator will often fail in getting all the eggs or will damage the fish. In the hands of a skilled stripper the loss will seldom exceed one per cent of the number of fish handled. They are stripped in a ratio of three to one or, for every three females stripped, one male fish is stripped of his "melt" or fertilizing sperm cells which have been previously described. To add, though, in this instance: A microscopic examination of the trout egg will reveal two tiny holes opposite each other and penetrating approximately one-third the way through. This male fertilizer immediately collects in these tiny holes and is at once sealed in by nature. Thus is the egg made fertile.

The collected eggs are called "green" in their first stages and may be safely handled and shipped to distant points with proper care. Boxes, or crates, about two feet deep by two feet square are provided with an open space at the bottom to allow the escape of water. The first crate is lowered into the box and held two inches off the floor by means of cleats. On the crate there is first placed a sheet of gauze, following this, a layer of water-soaked lake moss is placed and a thousand to fifteen hundred, or possibly four or five times as many, eggs spread about over the wet moss. In this manner crates are inserted one on top of the other until the last crate is reached, which is filled with cracked ice and this, melting, serves to keep the whole mass below wet and cool at all times.

After collection the eggs are taken to various hatcheries where they are placed in hatching troughs. These

consist of ordinary lumber troughs, approximately ten feet long by ten inches deep and the same in width. They are placed parallel about two feet apart in a building that is kept at the proper trout temperature by means of an ordinary stove. It should be kept just warm enough so that the water will not freeze. Into each of these troughs is turned a stream of constantly flowing water. The end of the trough where the water enters is raised a couple of inches in order to give the water a short, sheer drop into the trough, thus thoroughly aerating it. Next, the eggs are placed in hatching trays, from three to five thousand per tray. The trays, just fitting in the trough, are then submerged and may be placed one on top the other as long as they are under water.

Next follows the work of "picking" the eggs. This consists of taking the trays from the trough in turn and closely examining them for infertile eggs and those attacked by disease or otherwise injured. They are quite easy of detection since a few days in water will tend to whiten those which are infertile, diseased, or injured. The fertile, healthy egg is a pure transparent amber. Every tray should come under close inspection at least once every day and oftener if time is available. It is vitally necessary to keep them cleanly picked in order to prevent the spread of ever-present disease.

The first intimation of embryo will come in only a few days after being placed in the troughs. By holding the egg lightly between the thumb and fore-finger and turning it toward a strong light, veins, or, "bloodshot" will be plainly visible, spreading from the center of the egg. Gradually this bloodshot appearance will work toward the center where a spot will form. Later, from the spot, a head and tail will form, gradually extending until it has protruded through the egg. The born fish now has a strikingly odd appearance—a head and tail appended to a sac. This is as it should be. The sac contains the food which will keep the little fellow alive as it gradually stretches out in an oval shape forming his body. From this stage on he realizes his importance as a fish, taking his chances against the current in the bottom of the trough and his living from the microscopic water life. After a month, although appearing as little else than an eye and a tail, they will swim vigorously, play, and suck blood from tiny bits of liver placed within their troughs. After another month they will eat greedily and do well on the stronger meat of beef heart. They may be, and often are, placed in the public streams in this period of infancy although at a decided loss.

Without question it is better to keep these young trout, or fry, in retaining ponds for a period of from two to six months before placing them in the public waters.

Thus, may you learn of the problem. In the streams of the Rocky Mountains there are many places where spawn may be taken; there are many, very many, hatchery sites. The construction of traps and hatcheries and the work of hatching does not take a very large outlay in money. Comparing the outlay in cash to the benefits derived, the cost is insignificant indeed. Fifteen hundred

(Continued on page 688)

SCENTED WOODS

BY SAMUEL J. RECORD

PROFESSOR OF FOREST PRODUCTS, YALE UNIVERSITY

WITH the woods of the world to choose from one can easily arrange a whole scale of scents from the sweetest and most delicate of perfumes at one extreme to rank and overpowering odors at the other. The stores of the perfumer's shop will not yield a greater variety than one can find in woods. There too are to be found distinct impressions of flavoring essences, spices and condiments, of crushed fruits, of various kinds of vegetables and of nuts, and a host of other things often too vague for expression.

Were our sense of smell more highly developed and better trained we should find that every wood has its own peculiar scent by which alone it could be distinguished from all the rest. How often do we say that a wood is odorless when we mean that the impression we get is too subtle or vague for definite perception.

Both odor and taste are purely subjective. Our perceptions of them do not admit of expression and comparison by means of figures as in the case of other observations. Moreover, smell and taste are quite differently developed faculties in each individual. The impressions we get depend not only on our keenness of scent but also upon a whole train of past experiences and previous impressions. What does "sweet as the breath of kine" mean to the average city dweller?

No one fully appreciates the inadequacy of language—written or spoken—until he has attempted to express in words some unusual odor or taste perceptions. It is then he realizes that they are of the fourth dimensional stuff of which dreams are made. Often the best one

can do is to indicate whether the sensation is pleasant or disagreeable, mild or pronounced, and sum up the rest by saying it is peculiar.

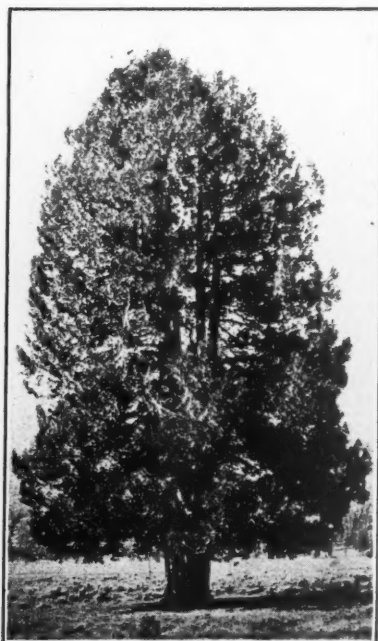
Many definitions of an odor violate the first law of definitions by describing it in terms of itself or of some derived product. We say that red cedar smells like a lead pencil or a clothes chest, Spanish cedar like a cigar box, western cedar like a shingle, and that white birch tastes like a spool! English writers have a habit of saying pine smells like deal, in other words that pine smells like a pine plank! Such



A MAGNIFICENT INCENSE CEDAR, NEAR PASADENA IN CALIFORNIA. THE WOOD OF THIS TREE IS VALUED BOTH BECAUSE OF ITS FRAGRANCE AND EXCELLENT WORKING QUALITIES

comparisons, however, have the merit of conveying a pretty definite meaning because they are in terms of things with which we are all more or less familiar. They will have to stand until someone invents an odor scale!

Names of woods are often derived from their odor. Anything that has a fragrance akin to that of our common cedar is forthwith a cedar without any regard to the botanical relationship. In the real cedar family we have not only a great many different species but also various genera of trees scattered all over the world.



WESTERN RED CEDAR IN CALIFORNIA. IS KNOWN ALSO AS SHINGLE WOOD AND IS NOTED FOR ITS FRAGRANCE

There is our eastern red cedar or juniper, the western red or shingle cedar, the northern and southern white cedars, the yellow cedars or cypresses, the incense cedar, the true cypresses, the deodar, the atlas cedar, the Clanwilliam cedar and the famous cedar of Lebanon. They are among our most valued woods not only because of their fragrance but also because of their excellent working qualities and their great resistance to decay and to insect pests.

The Spanish or cigar box cedar, known locally as cedro, is not a co-



LARGE WESTERN RED CEDAR, ON STANISLAUS NATIONAL FOREST, CALIFORNIA

niferous wood but belongs to the mahogany family. In fact it finds its way into the market as mahogany and may not be readily distinguished from that wood except by its odor. Other aromatic woods of this family are the toon or Indian red cedar, the ca-

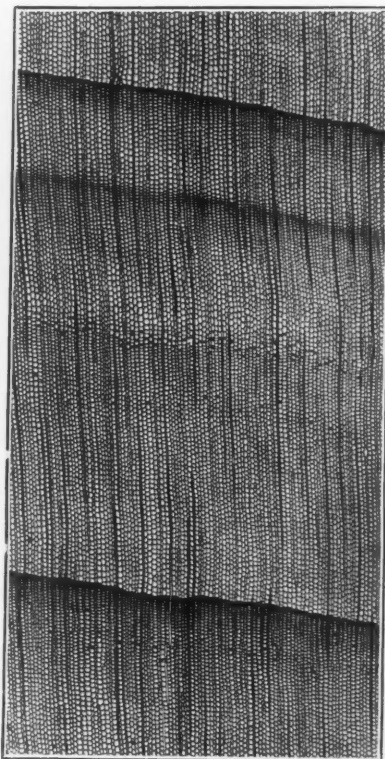


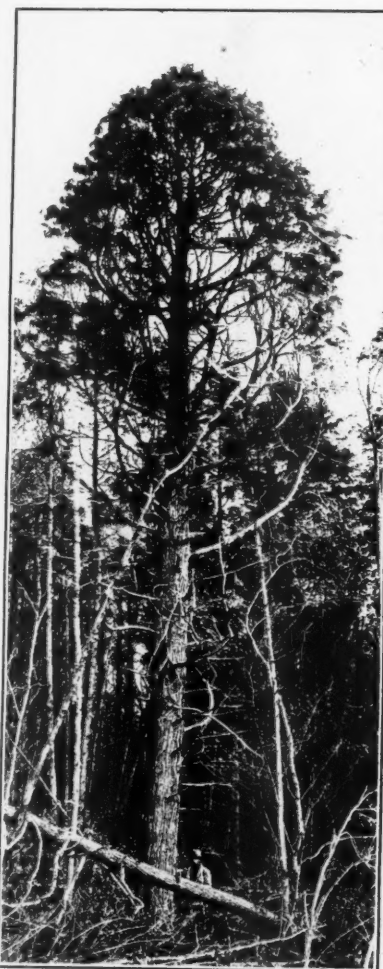
Photo-micrograph by S. J. Record.

CROSS SECTION OF RED CEDAR (*JUNIPERUS VIRGINIANA*) SHOWS THE RESIN CELLS IN ZONES THROUGHOUT THE GROWTH RING. IT IS IN THESE CELLS AND THE CELLS OF RAYS THAT THE RESIN IS FOUND WHICH GIVES THE PECULIAR ODOR TO CEDAR WOOD AND ADDS TO ITS DURABILITY

lantas of the Philippines, the margosa or neem of India, and the bead-tree, Persian lilac or white cedar of Australia. Here, too, may be classed the Australian rosewood with its scent of cedar rather than of rose.

The Borneo cedar or seriah belongs to the dipterocarp family from which our so-called Philippine mahogany comes. In British Guiana are two woods, the yellow silverbally and the kretty, with cedar-like odor, though they belong to the sassafras family and are closely related to the greenheart used so extensively in building the Panama Canal. The narra of the Philippines and the Malay Peninsula, a wood of the locust family, has a

faint sweet odor when fresh. Just as these woods are commonly called cedar because of their odor so other woods without odor are sometimes called by the same name because of their resemblance, fancied or otherwise, to the woods that smell like cedar. The writer has in his possession a cigar box made of "Michigan cedar" which in reality is elm. A certain natural similarity in grain with a touch of color added produces a passable substitute for Spanish cedar for a not too discriminating



LARGE WHITE CEDAR, FRAGRANT AND ALMOST IMPERVIOUS TO INSECT ATTACK

trade. Certain South American woods are called cedro though they have only the slightest resemblance to the real cedar. Other woods such as yellow poplar and basswood, which have neither odor nor grain, may be printed in the color and figure of Spanish cedar or they may

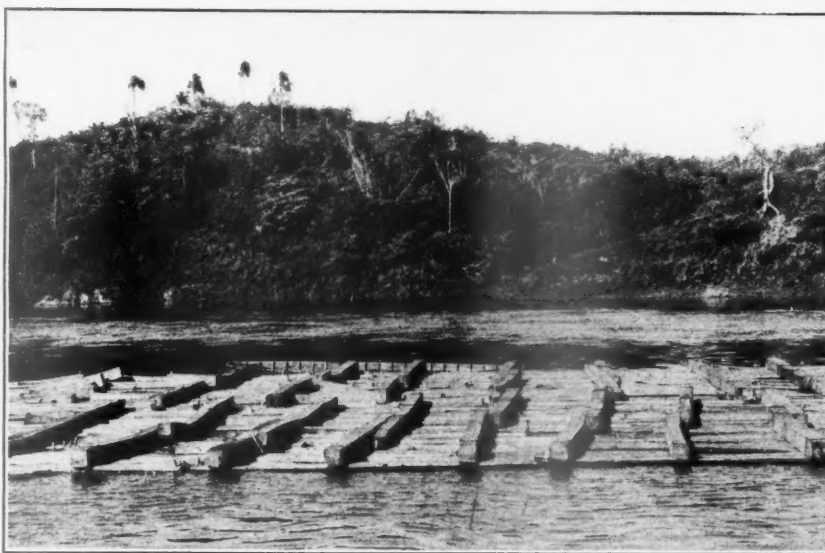
be covered with printed paper. Cedar is used for cigar boxes because the aroma of the wood is supposed to add to the bouquet of a cigar and the trade custom requires that cigar boxes at least appear to be made of cedar.

Cedar is used in various forms for repelling insects. The chips from pencil factories are distilled for their oil or ground up and sold for use in protecting rugs and woolen garments from moths. Chests made of Tennessee red cedar and also of Spanish cedar are widely

protection afforded by a cedar chest is due to the odor and the other 95 per cent to the fact that it is physically exclusive.

We can pass by easy stages from the cedar odors to those of sassafras and camphor of the laurel family. The santol and melasantol and the tucung-calao of the Philippines belong to the mahogany or Spanish cedar

but it takes more than a smell of cedar to keep the eggs, once laid, from hatching or the larvae from pursuing their destructive feeding. Cedar chests are usually well made with tight fitting covers and if articles are free of moths and eggs when they are placed therein they will not suffer attack. About five per cent of the pro-



Photograph by H. M. Curran.

A RAFT OF CEDRO LOGS ON THE PARANA RIVER, ARGENTINA. THIS IS THE SPANISH OR CIGAR BOX CEDAR AND BELONGS TO THE MAHOGANY FAMILY



Photograph by G. E. Mitchell.

CEDAR OF LEBANON—A GIANT OF THE GROVE WHICH HAS LOOKED WITH TOLERANCE ON THE RISE AND FALL OF THE POWERFUL OF THE EARTH

advertised and used for protection of furs and woolens from moths. Their efficiency is limited, however, and too much faith should not be placed in them. Adult moths are repelled by the odor if it is strong enough,



A TWENTY-TWO YEAR OLD CAMPHOR TREE AT ORANGE CITY, FLORIDA. SHOWING CHARACTERISTIC DEVELOPMENT WHEN GROWN IN THE OPEN

family and have a more or less pungent aromatic odor resembling both cedar and camphor. Two leguminous woods widely distributed in South America are much alike in every way except that one is a rich red and the other brown. They are variously known in Brazil as cabriuva, oleo vermelhbo and oleo pardo, and in Colombia and Peru as balsamo, and have an aromatic fragrance suggesting a combination of cedar, camphor and chloroform. One feels the desire to inhale deeply when smelling these woods.

Our sassafras has a pleasant odor which is much more pronounced in the twigs, leaves and inner bark than in the wood. The spice bush or benzoin is of the same class. The California laurel or pepperwood has a sweet peppery fragrance. The embuya of Brazil and various other laurels or lauros of South America are more or less highly scented and find many uses on that account. The Brazilian sassafras has a heartwood that is often fairly saturated with an oil with an almost overpowering odor of sassafras. The kalingag of the Philippines is full brother of the camphor tree but the odor of the wood, which is strong and lasting, is almost exactly like sassafras.

The Borneo camphorwood or kapur has a pronounced camphor odor when fresh. It belongs to the dipterocarp family, nearly all of the trees of which are resinous.

True camphor is obtained from trees growing in Formosa and adjacent regions. Some is collected as exudations of gum but mostly it is obtained by cutting the wood into chips and distilling it. There is great demand for this wood for the manufacture of chests, drawers and insect-

proof cases, and cabinet makers find it difficult to get enough of the genuine wood for their work. Accordingly they make imitations, using some light cheap wood after first treating it with camphor oil. These imitation camphorwood chests are not durable and the effect of the oil is soon lost. Camphor can be

produced artificially from the resin of pine trees.

There are many flower-scented woods. The rosewoods are the most common and there are several kinds on the market. The Brazilian rosewood is known locally as jacaranda, with various qualifying terms to indicate the



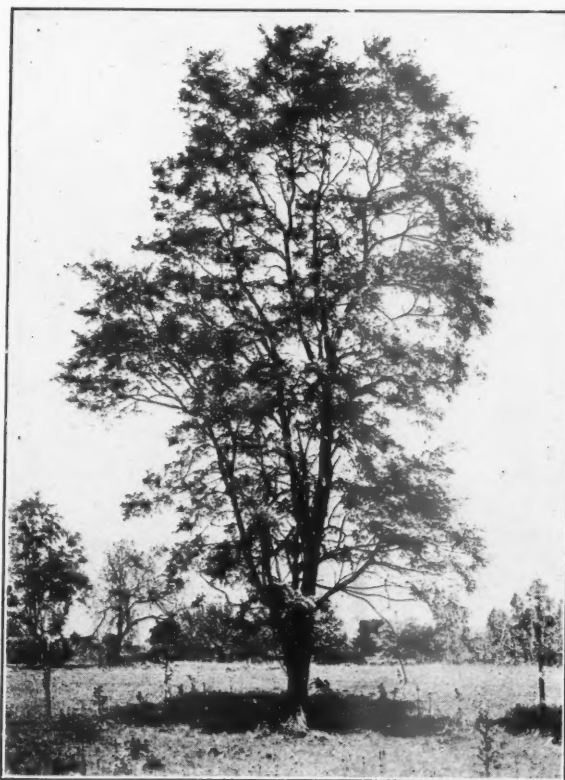
ROWS OF CALIFORNIA PEPPER TREES BORDERING A COUNTRY ROAD ON THE HILLS OUTSIDE OF LOS ANGELES



A DELIGHTFUL SPOT IN THE MUIR WOODS, SHOWING CALIFORNIA LAUREL BENDING OVER A LITTLE STREAM RUNNING THROUGH THE FOREST. THE WOOD OF THIS TREE HAS A SWEET PEPPER FRAGRANCE

color or other special property. There is still confusion about the botanical status of these woods though they are generally referred to the genera *Dalbergia* and *Machaerium*. There are so-called rosewoods in all parts of the Tropics, but some of them get the name from their rose color. The sweet-scented mimosa of India, Burmah and Ceylon, the griting of Borneo and the blackwood of Africa have a more or less pronounced odor of rosewater. It is said that the wood of the common European elder has a like fragrance when freshly cut.

Myall or violetwood of Australia, the product of two species of *Acacia*, has the delightful scent of violets which becomes very pronounced when the material is being worked. If one wishes to retain a high opinion of this wood it is well not to taste it. The hackia of British Guiana and the West Indies is said to give off an odor when worked distinctly resembling the tuberose, while the manchineel of Central America and the



THE BLACK LOCUST. ITS TIMBER, WHEN FRESH, TASTES AND SMELLS LIKE GREEN BEAN PODS

Antilles is lavender-scented. The oil of guayac wood, obtained from a South American tree closely related to the *lignum-vitae*, is used in the perfume industry for the purpose of producing a tea-rose odor. A distinct scent of musk is imparted by the woods of the musk-tree of the Fiji Islands and the muskwood of Australia.

The cumuru or tonka bean of South America is the source of a material used extensively in flavoring snuff. Most of this comes from the pods, but enough is contained in the wood to impart a mild odor of vanilla. Sometimes very oily specimens are somewhat rancid and the perfume obscured. The umburana of Brazil is a soft yellow wood so delightfully scented with vanilla that one is tempted to eat it. In western Australia is a species of *Acacia* called rasp-

berry jam wood because of its odor which is powerful and almost overpowering when the wood is freshly cut. Then there are vegetable and nut odors. An English authority says that the fresh wood of the horsechestnut,



Photographs by C. H. Pearson.

A GROUP OF BRAZILIAN ROSEWOOD, KNOWN LOCALLY AS JACARANDA THE CUMURU OF SOUTH AMERICA THE MANCHINEEL TREE OF CENTRAL AMERICA, HAS A DELICATE SCENT OF LAVENDER

a tree often planted along our streets, smells like "rubbed potatoes." The wood of the red bean of Australia is said to smell just like Swedish turnips when newly cut. This turnip odor is also more or less pronounced in our Nootka cypress. Black locust timber, when fresh, tastes and smells like green bean pods.

The ipil and tindalo of the Philippines have a peculiar oily odor resembling that of raw peanuts. The West Indian satinwood suggests coconut oil and the paperbark tree of Australia is said to smell like Brazil nuts while being worked. The kulim of the Philippines and Malay Peninsula gives forth a strong aroma of onions, while the pao d'alho of Brazil is properly known as garlic wood. The New Zealand black pine has a faint aroma suggesting new mown hay. A Dutch East Indian wood gives a distillate which reminds one of cinnamon and rhubarb.

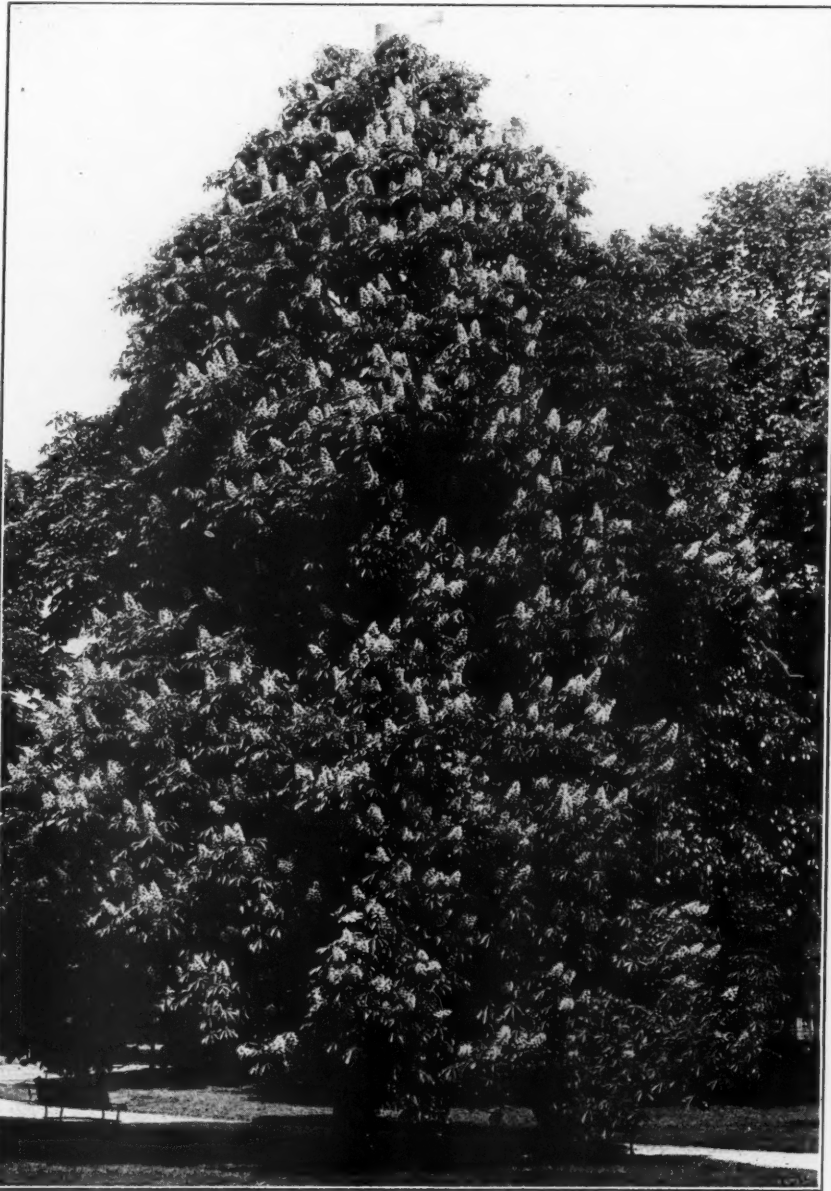
Slippery elm wood smells more or less like licorice, the catalpa like kerosene, the pinon pine and sometimes the sugar pine, like beeswax. Dark, resinous specimens of our own southern cypress have a mildly unpleasant odor of rancid butter. The wood of the celery pine of New Zealand is said to have a faint smell when worked, like bad cheese. The pagatpat of the Philippines has a fishy or "swampy" odor, especially when fresh. The cupang and batino of the same country and the so-called stinkwood of South Africa have strong

and very disagreeable odors when drying. The oily heartwood of our viburnums has an extremely disgusting smell which is far-reaching when the material is fresh and never completely leaves it. The Australian sandalwood is like burning joss sticks, overpowering and sickly when in quantity.

There are a number of so-called sneezewoods. The

Zulu sneezewood has a peppery smell which often excites sneezing and running of the eyes when worked. The acle of the Philippines and the blue mahoe of the West Indies are peppery and are said to excite violent sneezing when the dry wood is being worked by machinery.

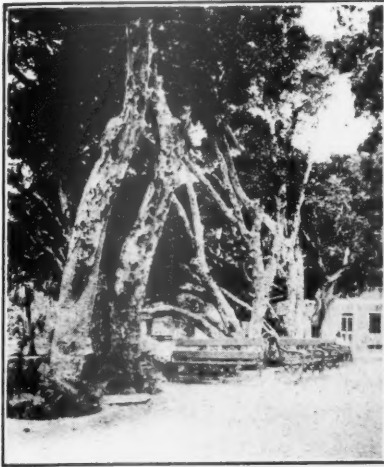
Many woods have an unpleasant odor when fresh and during the seasoning process but later lose it partially or entirely. Our hemlock and certain kinds of fir, and the Philippine cupang are in this class. Oak, particularly red oak, has a peculiar acid smell when curing. The blue gum and certain other eucalypts of Australia smell like acetic acid



A HORSE CHESTNUT IN FULL BLOOM. AN ENGLISH AUTHORITY SAYS THAT THE WOOD OF THIS TREE, WHEN FRESH, SMELLS LIKE "RUBBED POTATOES"

when freshly worked. The malacadois and tuai of the Philippines suggest aromatic vinegar when newly cut. The urung of the same source has when fresh "a distinct aromatic and somewhat acid odor reminding one of cider." Teakwood, according to one authority, has a "smell characteristic and powerful, like old shoe leather, very offensive when being worked," but another says it

has "a pleasant and strong aromatic fragrance." The dry specimens examined by the writer had a mild rancid odor. Some woods give off a very disagreeable odor when burned. Among these may be mention-



Photograph by C. H. Pearson.

TRUE LIGNUM VITAE, QUEEN'S PARK, BARBADOES, B. W. I.

ed the Indian tamarix, the Philippine bantino and the palo verde of our desert Southwest.

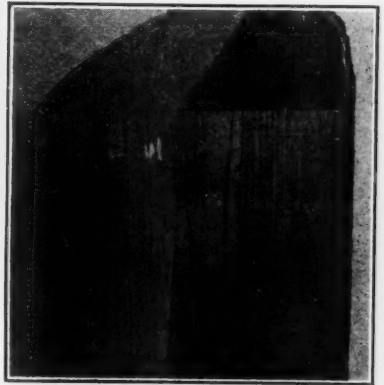
The most famous of all scented woods is the incomparable sandalwood. The true sandalwood (*Santalum album*) is an oriental tree whose use for perfumery and incense began



BARK OF THE ODORIFEROUS SLIPPERY ELM, REMINDING ONE ALWAYS OF FRESH LICORICE

Java, one from Australia and another from the West Indies and Venezuela. The Philippine agaru has "a distinct characteristic odor, when fresh, reminding one of sandalwood; it soon disappears superficially, but is again perceptible on merely scraping the surface." The Venezuelan wood is now generally imported as amyris wood and the oil distilled from it bears not the slightest resemblance to the sandalwood.

Fragrant woods have always been held in highest esteem among primitive people and were considered especially pleasing to the gods. Accordingly, they have figured prominently in their religious ceremonies and burial rites. Sandalwood is of



A SECTION OF WOOD OF THE CATALPA TREE, WITH AN ODOR PECULIARLY LIKE KEROSENE

the first rank in China and other countries where it

can be obtained. In Borneo there is a large tree called kayu gharu which occasionally forms a small blackish and highly resinous heartwood highly valued for in-



PINION PINE GROWING IN CRACK OF ROCKS IN COLORADO. THE WOOD HAS A DISTINCT ODOR OF BEESWAX

thousands of years ago and whose popularity remains undiminished. The later Greeks considered it one of their greatest luxuries and no festivities were complete without it. There are many false sandalwoods, at least three from India, one or two from the Philippines and



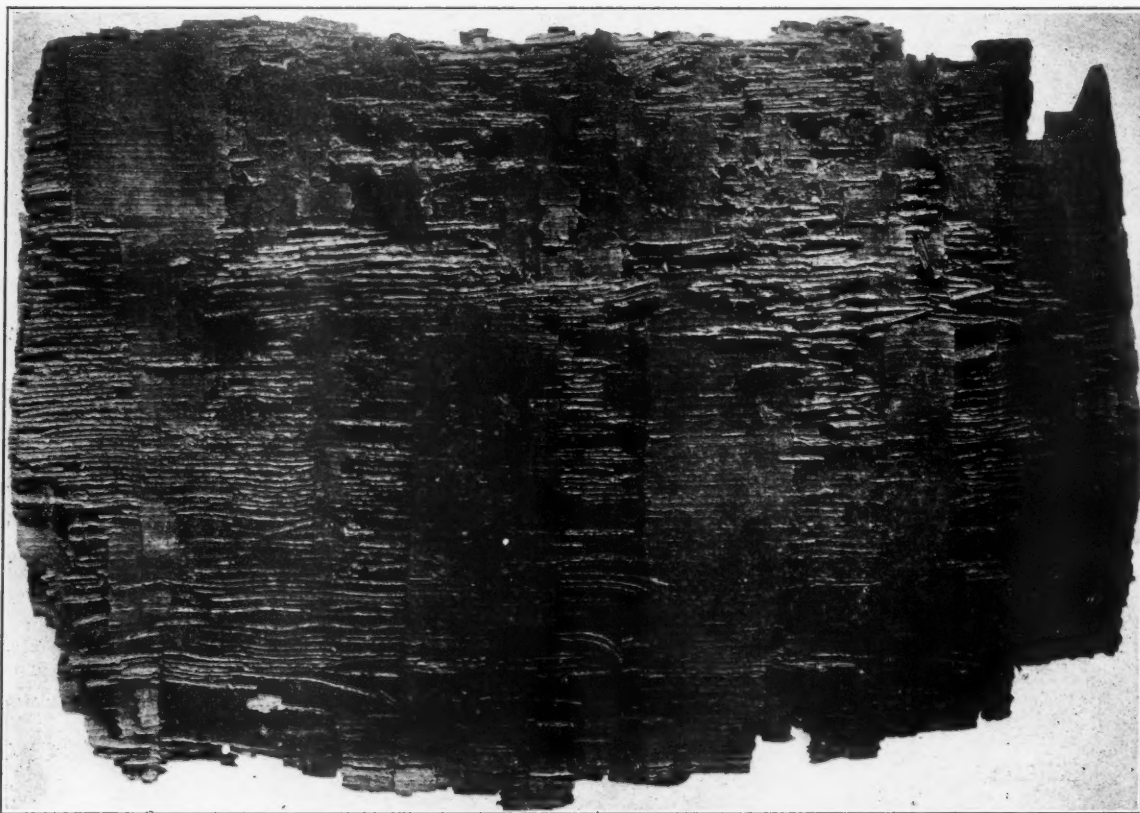
ARBORVITAE GROWING IN A TEMPLE COURT IN CHINA AND BELIEVED TO BE BETWEEN 800 AND 1,000 YEARS OLD. ITS WOOD IS CONSIDERED SACRED BY THE ORIENTALS

cense wood in Malay and China. The roots of a leguminous plant related to the rosewood, produces a low grade incense wood called kayu laka in the Malay region. In some parts of the Himalayas and in the Khasia Hills the yew tree is called deodar (God's tree), the name that is elsewhere applied to a true cedar. The wood of the yew is burnt as incense as is also that of the cypress. One of the favorite woods for incense in the Buddhist temples of India is the juniper. In parts of South America a wood closely related to the *lignum-vitae* is called palo santo (sacred wood), because of its use for incense in churches.

There are numerous curious or superstitious beliefs regarding fragrant woods. The Burmese have a superstition that beams of balances should be made of the Thitman or prince of woods (*Podocarpus neriifolia*),

while a peg of it driven into a house post or boats will avert evil. The Shinto temples are always constructed from the wood of the Japanese aborvitae or hinoki tree. Water pails and other vessels made of our southern white cedar were long held to have a wholesome effect on the contents because of supposed medicinal properties of the wood. It was even believed that water issuing from a white cedar spigot had its healthfulness increased. The northwestern Indians nearly always made their totem poles out of western red cedar, but this choice was probably due more to the fact that the wood is easy to work and extremely durable rather than to its fragrance. It may be taken as a very good general rule that woods that are scented are resistant to decay and insect attack, and have good cabinet qualities.

A REMARKABLE SPECIMEN OF QUARTERED WHITE OAK



This very unusual photograph was taken of a section of partially decayed wood from an old white oak stump and shows, better than he has ever seen it, the structure of oak wood, writes George N. Lamb, secretary of the American Walnut Manufacturers Association, from Chicago. The surface shown is a radial section, as is the cut of "quarter sawed" wood. The medullary rays that make the "flake" in quarter sawed oak are here shown as upright bands or ribbons of various widths that extend from center to bark in ripples or waves. The above specimen shows this characteristic structure almost better than would a diagrammatic drawing. In this case, at least, the rays proved to be harder and more durable than the rest of the wood.

FOXES—AND WHAT WE KNOW OF THEM

BY DR. R. W. SHUFELDT, C. M. Z. S.,

MEMBER OF THE AMERICAN SOCIETY OF MAMMALOGISTS

VARIOUS kinds of foxes are found in the Old World; but as a matter of fact, in no quarter of the globe are they better represented than in North America. And of all the mammals that have been talked and written about, no single group has received one-tenth part the attention that foxes have. Apart from the tales of tradition, the history of foxes dates back to the day when printing presses first came into use—when history came to be a matter of printed record—and today the volumes devoted to this family would form a very extensive library. Several hundred books have been written upon the subject of fox hunting in Great Britain alone, and a similar literature is now coming into being in this country. Foxes have figured in the fables of every race of men on earth since the dawn of history, and even at the present writing they continue to be rung in by writers of every ilk in

exemplification of all that is cunning, shrewd, sly, and artful in the ways of men and all other mammals. "Sly and cunning as a fox" is an expression common to the language of our race the world over. For example, take what the fox did out of the fables of Æsop and other writers of fables, and their works would be robbed of four-fifths their interest.

These animals are, as an independent group, very distinct from the dogs, wolves, and jackals, and in general characterized by light, though well knit frames, erect ears, markedly pointed muzzles, and eyes of which the pupils contract to mere slit-like apertures in the daytime—much as we see it in the cats. The fur of a fox is very thick and its tail bushy. In some species the pelts are of great value commercially, and in all cases they are of more or less worth. In some the fur is almost

black, in others white, and in still others silvery, a light red, gray, or brown.

We find large foxes in certain parts of Asia that are of a yellowish-red color—the Chinese and Japanese species being a light red—while in India we meet with the Bengal fox and the small species known as the Desert fox. The latter feeds upon grapes, and may have been the one responsible for the fable of the "Fox and the Grapes," though some say that it refers to those extraordinary little big-eared foxes of Africa called

Fennecs that also eat grapes. The Fennecs are very elegant little creatures, one of them measuring only nine inches in length; their hearing is said to be most acute. The common fox (*Vulpes vulgaris*) of Europe is too well known to require any special description; it has figured in history ever since printing came into vogue, and is a remarkable



CUBS OF THE COMMON FOX

Figure 1. They are usually born early in the spring, being reared principally upon young rabbits, which are produced in numbers at the same season. This is a copied photograph by the writer after C. Reid, who obtained several negatives of this group.

animal, occurring not only in Europe but in Asia and Africa as well.

Coming to the foxes of North America, not a little has likewise been written about them; but we have yet a great deal to learn about their anatomy and habits. Zoologists have, as a rule, divided them into two genera—*Vulpes* and *Urocyon*. The true foxes are characterized by rather short bodies, short legs, and long tails that are bushy and more than half the length of the body. Their fur is long and soft; their erect ears of moderate length, while the muzzle is elongate and tapering.

Up to a few years ago there were some eight species recognized by zoologists; these are distributed over various regions of North America, Harriman's fox being found on Kadiak Island, Alaska; the common American fox from Canada to Georgia, westward to the plains. The

boreal species known as the Silver Fox and Long-tailed Fox are found in Nebraska, westward to California, and southward to Arizona and Oklahoma, and to these must be added the Hall Island fox, the Arctic fox (Fig. 7), the Great-eared fox of southern California, the Kit fox (Fig. 6), and the Nova Scotian and Newfoundland Red foxes—forms closely resembling the common species. These have all been described in various books, as well as the forms contained in the genus *Urocyon*, which are the "short-muzzle" foxes, further characterized by a concealed mane of stiffish hair down the dorsum of the tail—that is, not intermixed with the ordinary fur. *Urocyon* contains all the Gray foxes, as the Gray fox, and the Florida, Texas, California, Townsend's, Wisconsin, and the Dwarf Gray foxes.

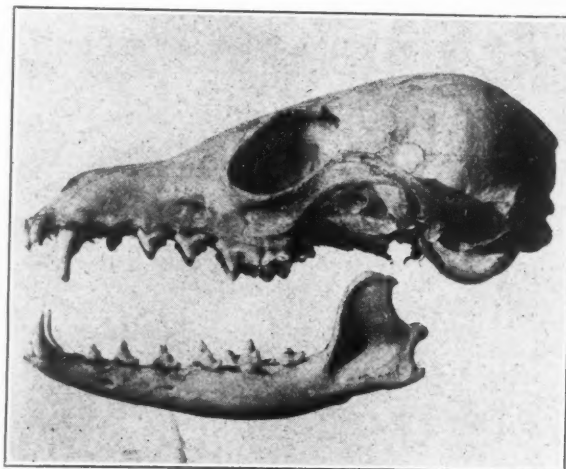
The American Red fox is found in many localities from Canada to Georgia, and westward to the great plains. When it exhibits a dark cross on the back and shoulders, it is known as the Cross fox, and when the animal is all black with a white-tipped tail, it is called the Black fox. As has been shown, three well-known subspecies of the red fox are recognized, and they extend the genus over a large part of North America. Where these do not occur we meet with other distinct species, as the Newfoundland red fox in Newfoundland, and others.

At different times the writer has had opportunity to study a large number of these species and subspecies, in nature as well as in confinement, in regions where they were more or less abundant, and it has been noticed that foxes vary greatly. In England, where they have been chased for many generations, they have become so wily and cunning that it is no uncommon thing to have an old fellow completely outwit both men and hounds and make good his escape; this is especially true of the foxes in Leicestershire, which is the best fox-hunting country in all England. This fact is mentioned because of late our more experienced fox-hunters in New England have begun to notice the same change taking place in our red foxes. Having been hunted for many years past, they, too, are becoming better educated in the ways of hunters and hounds, and ere long they will, no doubt, be as good at getting away from their pursuers as are the foxes of England; in fact, no wild animals profit more successfully by their experience in the matter of avoiding danger than foxes do. Out West, years ago, the writer noticed that the foxes there had none of this educated caution and intelligence; their audacity and boldness was due

to an utter lack of knowledge of their arch enemy, man, and not to a confidence in their power to escape him in critical situations. On one occasion he was out on foot hunting, and he carried a shot-gun loaded with heavy shot. Passing over the prairie and along the foothills, he came to place where there were several large burrows in the ground, and at the entrance to one of them stood three nearly full-grown long-tailed foxes. They stood there staring just as though they had never seen a man with a gun before. No New England fox would have done it—he would have been down the burrow in a minute. As it was, it went very much against the grain to fire upon them, but nevertheless two of their number fell to the writer's gun, while the third disappeared down the burrow as quick as a flash, unhurt.

At another time, the writer was out hunting rabbits in Fairfield County, Connecticut, with his youngest brother. A very heavy fall of snow was coming down,

and there was already several inches of it on the ground. As the flakes were large and the wind was blowing, they were prevented from seeing objects at any great distance. In those days they owned an elegant St. Bernard dog, Bruno, who was very fond of going out hunting in a snow-storm. This was usually objected to, as Bruno knew no more about hunting than a woodchuck, and was often in the way; moreover, he conceived it to be his duty to commence violently barking at all sorts of critical moments. As they trudged along a narrow path by a piece of woods, the writer chanced to look



THE SKULL OF OUR DESERT FOX

Figure 2. This is the left side view, designed to show the forms and placements of the teeth. Lower jaw detached. This specimen was collected in Arizona, and is here shown to invite attention to the close resemblance it bears to the skull of some species of dogs, examples of which are to be seen upon the streets every day.

back, when, lo and behold! there was an animal trotting coolly along after them, about forty feet in their rear. It was at once taken for Bruno, and they yelled at him to go home, which only had the effect of halting the newcomer, who stood looking at them in the most saucy manner imaginable. Then it flashed on them that the animal was not Bruno at all but a fox—and a splendid, red animal at that. But before they could say "bip" he was off and out of sight in the storm, at a rate that would have filled an old coyote with envy. His color had saved his life, as they certainly thought he was Bruno. This, it was learned afterwards, is an old trick of Reynard's, and frequently practiced by him to baffle his arch enemies—dogs and men. He is seldom caught at it, however, as he watches the hunter with the greatest keenness, literally keeping in his footsteps, knowing full well that it is the very last place he will be suspected of being in by his pursuer. He is ready instantly to put himself out of sight when in danger of being discovered.

Foxes were very common in the neighborhood of the writer's home in New Canaan, Connecticut, where a great deal of poultry was kept. They frequently raided the hen-roosts, and that with marked success. One old fox in particular lived with his family in a deep burrow in the middle of a meadow about a quarter of a mile from the barn; he had a special predilection for ducks, of which a good many were kept, and he seemed to know just when to come for them. At night, most of the ducks came home and remained in the big barn-yard, enclosed by a solid, high board-fence, where they thought themselves perfectly safe from any prowling marauder that might take it into his head to make a meal of one or more of them. In this, however, they were mistaken;

that had attracted the writer's attention. When they caught sight of him they were off at a great pace. Again the writer failed to make out how the fox had managed to enter the barnyard; but in any event he managed it, and the writer is convinced that the vixen stood outside on guard as he performed the operation. Over at the burrow next morning there were scattered all about the entrance brown, white, and green feathers—the indisputable and aggravating evidence of the fine feast they had enjoyed.

Old Reynard has been pursued on horse and with hounds in nearly every State east of the Mississippi, where he is found in sufficient numbers to render his hunting an object of sport. In New England and in the



COMMON RED FOX

Figure 3. He has unexpectedly come across a rabbit. Foxes, both old and young, are very fond of rabbits, and in the course of a year they capture and feed upon a great many of them.

for, upon one very dark night, nine half-grown ducklings were missing, and the tracks about the wet places in the yard plainly told the story of the fox's success in reaching them. How he got over the fence, or under it, the writer has never been able to understand. For a week he laid for him with a gun, then gave it up. Several nights after that he chanced to be at the barn one moonlit night, and, as luck would have it, without a gun. Low, gurgling noises caught his ear, which were evidently coming from a duck in deep distress; and, almost immediately, who should come trotting across his path in the moonlight but the old dog-fox, with the vixen following close at his heels. He had the biggest drake thrown cleverly over his shoulder, and was crunching on its neck in his efforts to quiet the sounds

northeastern section generally it is considered legitimate to shoot the pursued fox at the finish, or during any part of the chase; while in Kentucky and Tennessee and other southern districts, such a practice is considered highly unsportsmanlike, and would subject the perpetrator to the severest criticism from every member of the guild. Strange as it may appear, it is nevertheless true that experienced old foxes, and those that have become familiar with the ways of men, horses, and hounds, seem to enjoy the fun quite as much as the hunters do. Frequently they have—and justly so—the utmost confidence in their powers to elude the hunters, and this they demonstrate upon numerous occasions. Then an old fox in the enjoyment of good health is more than a match, in a fair fight, for any average

hound—sometimes for two or three of them. It is only when run by packs in relay, exhausted by long chase, and overpowered by numbers, that he is vanquished.

There are those who believe that the red fox is not indigenous to this country, but that it was introduced here by the English during the early history of the Colonies. Certain it is that the red fox of Great Britain and the red fox of New England are very similar. In some sections the red fox is hunted in the snow in winter, and his schemes to avoid the hunters and the dogs at that season are quite as craftily laid as during the autumn. His pelt, however, when in prime condition, is always in demand, and furriers handle thousands of them as they handle the skins of other species of *Vulpes*. Unlike the gray fox which lives chiefly in hollow trunks of trees, the red fox prefers a good burrow for his home. Here, in the spring, the vixen brings forth her five or six young, and cares for them until they are old enough to shift for themselves. Besides such poultry as they capture, foxes are very fond of field mice and destroy thousands of them; in this way they are a positive benefit to the agriculturist. They also catch and eat many woodchucks—the latter standing in the utmost fear of them. Rabbits, some birds, game, rats, frogs, occasionally insects and fish, all come the way of old Reynard during the course of the season. It is rare that he is driven to partaking of carrion, though it sometimes happens.

To the best of the writer's recollection he has never seen a litter of very young cubs of the

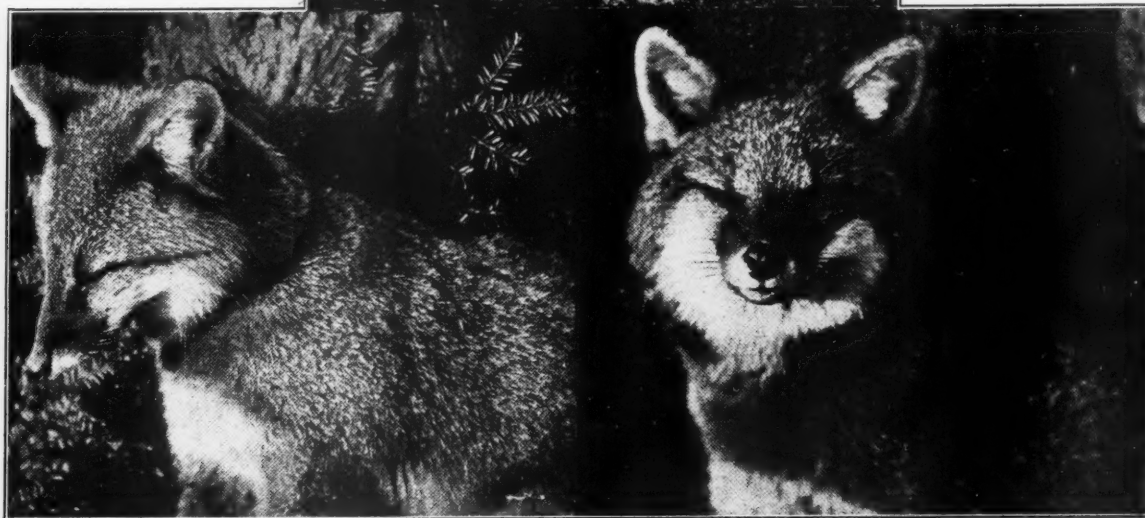
red fox, though they are not infrequently secured. They very closely resemble the whelps of the red fox of England, and a litter of these latter was most successfully photographed by C. Reid, published both in *Animal Life* and in *Living Animals of the World*. Through the courtesy of the publishers, we are permitted to reproduce one of these results here.

Another of the red fox's accomplishments is his ability to climb certain trees, where the inclination of the trunk and the accessibility of the lower limbs admit of it. His being able to perform this feat often saves his life, as does also his knowing how to swim. As a rule, he is not very fond of the water; and, in crossing a stream when undisturbed, he is careful not to wet his feet—if he can avoid it—by jumping from one dry stone to another.

Foxes are about at any time during the day or night, and one of them is just as likely to jump the feathered denizens of the barnyard at midday as under the cover of night, making off with his capture while the farmhands are at work in the meadows. If the weather be not very inclement, he prefers to sleep out in the open air, sheltered from the wind by some friendly rock or fallen tree. Often he will select the lee side of a hill for his snooze;

moreover, he can detect the approach of a pack of hounds better under such conditions, although he is likely to do this under almost any circumstances, as his sense of hearing is remarkably acute, while his sense of sight is by no means poor.

His extreme cunning renders him a very dif-



PORTRAITS OF THE GRAY FOX

Figure 4. Mr. Herbert K. Job succeeded in obtaining this fine series of pictures of this widely known animal; they are from life, and show well the habit this species has of closing its eyes when subjected to any annoyance.



HUNTING THE RED FOX ON SKI IN NORWAY

Figure 5. This Norse boy has shot a Red Fox in the hills of his country, and is proudly exhibiting it. The photograph was made by the late Professor Robert Collett, of Christiania, curator of the Museum of Natural History in that city, and presented to the writer. The species very closely resembles our American Red Fox.

difficult animal to trap, especially in the case of foxes in the northeastern sections of the country, where they are becoming so knowing that they may steal the traps set for them some day, and use them on their own account to catch woodchucks with—thus gaining valuable time for play and for serious thought upon the subject of outwitting dogs and men. If by chance he is caught by the leg in a steel trap, a fox will free himself by biting off the leg—quite as readily as a coon or a muskrat does it.

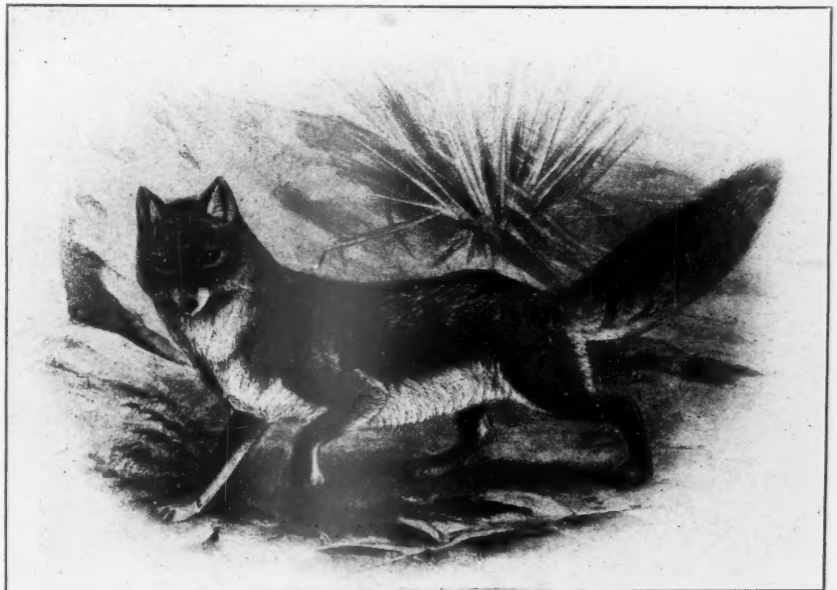
Red foxes have a very strong odor that appears to be especially offensive to dogs; this is not so much the case with the gray fox, the latter being a tidier animal in some respects. The bark of the gray fox can readily be distinguished from that of the red one, being more husky, fainter, and thinner, and it is heard principally in the spring during the mating season. The red fox will, when occasion calls for it, give vent to a kind of high-pitched screech, that when heard at night, is quite awe-inspiring; and this is its purpose, as it often serves as a protection for its young.

Not very much has been written upon the life history of the Kit or Swift fox, the energies of most modern mammalogists apparently having been directed

along other lines. Dr. John Strong Newberry says of this fox: "We had no opportunity of observing the animals in confinement, nor of testing by actual experiment the truth of the report which gives to this small, short-limbed fox such fabulous speed. All those who were familiar with them, however, agreed in saying that its swiftness has been greatly overrated; that it is even less swift than its congeners, the red and gray foxes; all of which the appearance and structure of the animal fully confirms."

The writer has seen the Kit fox a number of times in zoological gardens, but only a few times on the plains. That this species possesses remarkable powers of speed, when it has the opportunity to exert them on comparatively level country, there can be no question.

The Arctic fox is found in the boreal region of not only North America but of Europe and Asia as well; it is rarely found below the 50th parallel of latitude. This species was described by Linnæus as long ago as 1766, and possibly a few subspecific forms yet remain to be described by science. Professor Gibson says of it that "it is somewhat smaller than the European fox, its ears being less pointed and the muzzle shorter. The soles of its feet are densely furred, resembling those of a hare, hence its specific name, *lagopus*. As with many Arctic animals, the color of its fur changes with the season, being in most cases of a pure white color in winter, with the exception of a few black hairs at the extremity of the tail. Toward the end of April, when the Arctic snows begin to disappear, the long white fur gives place to shorter hair of a dark brown or sooty color. Occasionally a dark-colored fox may be seen in winter and a white one in summer, and in Iceland, according to Professor Newton, the winter coat differs very slightly from that



THE KIT OR SWIFT FOX

Figure 6. One of our smaller vulpine species, so named for its extreme swiftness when running. This is one of the most beautiful of all American foxes, and by no means an easy one to capture.

of summer, probably owing to the comparatively mild character of the Icelandic winter. The Arctic fox has little of the proverbial cunning of its kind, having been seen to walk unsuspiciously into the trap which has been baited in its presence. It is an exceedingly cleanly animal, and the fætid odor, characteristic of the entire genus, is almost absent in this species. It differs also from the common fox in being gregarious, living, according to Richardson, in little villages consisting of twenty or thirty burrows placed near each other. The Arctic foxes seek their food, which consists of lemmings, birds, eggs, and carrion, at night, and their first impulse, says Captain Lyon, on securing it is to hide it, even though suffering severely from hunger. It was suggested, some years ago, by Professor Newton that this species supported itself during winter on a store of provisions laid up during summer, and Captain Fielden was able during a polar expedition to confirm this. Even in Grinnell Land, he and his companions came upon Arctic foxes, and were greatly surprised on discovering numerous deposits of dead lemmings. 'In one nook,' says Captain Fielden, 'under a rock, we pulled out over fifty; we disturbed numerous caches of twenty or thirty, and the ground was honeycombed with holes, each of which contained several bodies of these little animals, a small quantity of earth being placed over them.' (A Voyage to the Polar Sea, by Captain Sir G. Nares.)"

John Murdoch gives a short account of the Arctic fox in the Report of the International Polar Expedition to Point Barrow, Alaska, and he speaks especially of the great speed of this species when alarmed. "They seem almost to fly over the ground instead of running." A still better account than Murdoch's is to be found in Nelson's Report upon the Natural History collections made in Alaska between the years 1875 and 1881. Here the two color phases of the species are described as though they were two subspecies of the Arctic fox. They are spoken of as the "White Stone Fox" and the "Blue Stone Fox," although it is stated that the habits of the

two forms are identical. Writers of the present, however, make no distinction between the blue and the white fox, having discovered that the two pelages are simply seasonal changes. Nelson found the "White Stone Fox" wonderfully abundant in some localities, it being resident in some places. This was the case along all of the belt of open country north from the peninsula of Alaska around all of the Behring Sea and Arctic shores of the territory. When connected by ice, they were also found upon the islands of the Behring Sea and those of the Behring Straits. They were found to be extremely numerous in all the open country lying between the Lower Yukon and Kuskokwim Rivers.

In support of the fact that Nelson and True took the "Blue Stone Fox" to be an entirely different form from the "White Stone Fox," they say in their account

that "although the White Fox is unknown upon the Aleutian Islands, the Blue Fox is found throughout the chain, and also upon the Fur Seal Islands. On the latter it is very numerous; and as these foxes have a particularly fine fur, great care is exercised to kill any stray specimens of the White Fox that the ice may bring over in the winter, and thus prevent



THIS IS THE ARCTIC FOX OF AMERICAN BOREAL REGIONS

Figure 7. It is white in winter and bluish-gray in summer, and both pelages are here shown. This figure and the preceding one were copied by the writer from Professor St. George Mivart's great work on the canine species of the world, they being excellent likenesses of the living animals.

any crossing between the two forms."

In summer, before the animals lose their pure white coats, they are very conspicuous, especially when they cross any dark area of ground. In winter, the very reverse of this is the case, and their snowy coats not only protect them against their arch enemy, the gray wolf, but gives them opportunity to stalk ptarmigan and other game almost unnoticed until the moment of capture. Around camps in winter they make their presence known by their feeble and querulous barking, and if hungry they will steal anything eatable they can get hold of, from game to snow-shoe thongs.

The Esquimaux trap a good many of the foxes with a "figure-of-four," or with steel traps. Thousands of their pelts have been sold in the English markets, and a good blue fox skin is a thing of great value at any time. "Blue foxes are bred and kept for the sake of

their fur on some of the islands in Behring Sea; they are fed on the seals killed on the neighboring islands, and are, like them, killed when their coat is in condition." (*Living Animals of the World*.) In short, the life-history of this little fox is extremely interesting. Stone and Cram, who appear to be of the opinion that there are several geographic forms of the Arctic Fox, relate of the species that in "summer they hunt for lemmings in the moss-grown tundras and barren grounds, digging them out of their holes, or pouncing on them as they traverse their runways in the thick, wet sphagnum beds that cover the swamps and boggy places. At this season



FEW EQUAL THIS FELLOW FOR SLYNESS

Figure 8. As pointed out in the text, the Swift or Kit foxes stand among the most interesting species we have in the fox family. This is the Big-eared one, and those familiar with the animal in the Southwest will never question its swiftness afoot. (This figure, as well as Figures 9 and 10, were kindly loaned by the New York Zoological Society, and secured through the courtesy of Doctor Charles H. Townsend, Director of the New York Aquarium.)

the Arctic fox lives in luxury; for besides the lemmings there are numberless wild fowl nesting by the margin of every stream, and on the ridges willow grouse and snow bunting hide their eggs in the reindeer moss and low brush, or in warm hollows where the short-lived blossoms of the northland crowd together in dense borders of bright colors. The lemmings are so numerous and easily caught that a very few hours each day spent in hunting would easily keep the fox supplied with meat.

"But the little, stub-nosed blue fox, though he lacks something of the wily shrewdness of the long-headed red fox of the woodland, is nevertheless a very intelligent beast. Knowing that summer will soon be over, the lemmings safe in their hidden runways beneath ice and snow, and the birds all driven north before the cold, he hunts diligently while game is yet abundant, and brings home load after load of fat-bodied lemmings, to be packed away in cold storage for the winter.

"Where the blue fox lives, the frost never wholly leaves the ground; so he digs down in the moist turf until he reaches a temperature only just above freezing,

and packs down several dozen lemmings in a place, covering them with moss and sod. These caches of frozen lemmings are his principal food-supply for the greater part of the year."

Many of the habits of the grey fox are quite different when compared with those of the red fox. Where the gray fox is more or less abundant, the red one is scarce—and *vice versa*. They are opposed to each other in not a few respects, and in the long run the reds are the winners. The reasoning powers of the latter are finer; they are better plotters and schemers, and far more frequently plunder the poultry yards without paying penalty for it. Still, a gray fox is by no means a fool, and he has a number of physical advantages over his congeners; his inconspicuous gray pelt is an advantage to him, as is his smaller size. He can run quite as well, and is not so easily exhausted; moreover, the gray fox is a better tree-climber than the red, and so more frequently escapes in that way. His skin is not worth much, and therefore he is not especially hunted; and he



REYNARD OF THE CHASE. THE AMERICAN RED FOX

Figure 9. Foxes are, as a rule, not very tolerant of confinement, however careful we may be of their welfare and comfort. This fellow does not appear to be having a very happy time, although entirely safe from hounds or gun, and all his wants well looked after.

will eat almost anything he meets with, from a mushroom to a quail. Then, being more or less of a southern species, his living is surer in the winter—and all this combines to favor his existence and perpetuation.

It is rare that one finds a gray fox living in a burrow—they much prefer hollow trees or stumps, or a long, hollow log stretched upon the ground. To such places they are often chased by the hounds, and in them they take refuge when it is stormy and the weather unfit for a sensible gray fox to be out in. When it is pleasant,

they follow the example of other species of foxes and take their naps in the open air, sheltered from sun, wind, and observation, among the bushes.

The vixen may have as many as five cubs at a birth, and these she rears in some hollow trunk, on a nest composed of dry leaves and other soft materials of the woods. When able to shift for themselves, they are taught in ways that are foxy by their maternal parent; but after a very little while, they are compelled to make their own living and take their own chances in life.

Years ago, old General Buford, of Kentucky, owned an elegant pack of fox-hounds, and there is a good story told about one of his fox hunts. This gives such an accurate account of some of the habits of the gray fox,

and Bourbon counties, between which there was much good-natured rivalry, a young nephew of the General thought he would settle for good and all the mystery of the cunning, old gray's disappearance. From the unusually bold depredations, likewise from the various kinds of feathers around and about the cliff that had been plucked from the domestic poultry, it was pretty certain she had a litter of cubs somewhere near. So, on this day of the big hunt, Reggie Buford was on hand, concealed near the big oak and cliff, to solve the mystery. Promptly, on time, the packs started old "White-tail," for thus she was known because of a small white tuft of hair at the tip of her brush. She took the usual course, and gave the visiting and local packs a good run.



OUR GRAY FOX IS A WONDERFULLY HANDSOME ANIMAL AND FULL OF SPIRIT

Figure 10. We might almost imagine that this beautiful and intelligent species had grown gray in studying and comprehending the ways of men. It is hunted most unmercifully in all parts of the country, and the five here shown very well exhibit the characters of this species of fox.

that I take pleasure in repeating a few paragraphs of it. There was a gray fox which the General's pack invariably started in a ravine about three miles from the plantation-house where he resided. "This gray would run as long as it cared to, and then would disappear very near the place where it started and close to a high limestone cliff, near which there was a huge burr oak tree. The General was convinced that somehow this tree had something to do with the invariable disappearance of this cunning gray fox; but just how, or in what manner, he could not discern. The oak was certainly fifteen if not twenty feet from the cliff, near which the gray made her last appearance in a day's run.

"One day when there was about to be a field-day among the fox-hunting gentry of Woodford, Fayette,

Then, thinking she had done enough to vindicate the hospitable spirit of sport in her native country, she started for her usual point of disappearance. Directly, Reggie Buford saw her coming in easy lope, swinging her tail from side to side, with the pack at least a third of a mile behind. She mounted the limestone cliff, and, stooping to give herself the necessary impetus, leaped for the body of the great burr-oak tree. She caught it just below the nethermost limbs, and nimbly climbed up the shaggy trunk to a distance of about sixty feet from the ground; there she entered a hole just large enough to admit her. Young Buford went home and told his uncle what he had seen.

"That tree's hollow," ejaculated the General, 'I am sure of it. Tom, tomorrow morning you and Mose take

your axes and cut down that big burr-oak that stands close to the northwest line fence. And, Reggie, do you go along with them, and when the tree falls if the fox-den runs out from under the roots, have it dug out and capture the cubs. I want that den of foxes broken up, as we can never catch that old cunning vixen alive.'

The negroes willingly enough obeyed orders. After a quarter of an hour's chopping, down came the mighty oak. It was hollow for sixty feet from the ground upward, and there was a well-worn entrance to a den at the foot of the tree—the General's fox-hunting knowledge had stood him in good stead. The den ran off straight to the right for about fifteen feet, four or five feet under the ground, and terminated under the roots of a huge, yellow poplar, long dead, with its tall, spar-like trunk standing limbless in the air. It was no easy job to dig out this den of young foxes; it was evidently a very old one that had sheltered many generations of the vulpine kind. There were five cubs within it, just old enough to walk and to eat meat, for we found many chicken, turkey, and goose bones in the den, and what had been the thigh-bone of a lamb or kid—it was impossible to tell which. Of the young foxes three were males and two females. Two of the three males were as white as snow, the third was gray, and the other two gave evidence of being perfectly black when they had shed their first coat of hair, which they do at the same time they drop their milk teeth.

"General Buford did his best to bring all of this curiously marked den of foxes up to full maturity; but the white one, at about six months of age, took something like distemper in sporting dogs, and died. Another was accidentally killed by a horse stepping on it and breaking its back, and the third was found dead one morning in its pan. No visible cause for its sudden demise was apparent, so we simply had to put it down in the list of casualties, cause unknown. Thus was broken up one of the most famous fox-dens in central Kentucky."

No wild animal is more easily domesticated than the fox, either red or gray, and none exhibits so much sly cunning when tamed; but they are susceptible of a very high degree of affection for whoever has them in charge. The gray fox is one of the species we are most familiar with in the South; somehow we think it represents, in the highest degree, the lowest cunning and rascality of the fox race. Time after time we have heard well-authenticated instances of the gray fox pursuing and crawling after a covey of partridges, very much as a badly broken pointer would that had the hunting instinct, but had not been properly trained. Then, in audacity, the gray fox exceeds the red, for it will make its raid absolutely up to the barnyard, if it can thereby seize a fat hen or goose. The latter would seem to be its especial quarry—probably because the geese wander farther afield to the lakes and bayous that are around and about almost every plantation in the farther South.

Probably the habits of the Florida gray fox and other southern subspecies are quite similar to the species just described; they may differ a little, owing to the nature and conditions of their several environments; but it is not likely that these differences are very marked. The dwarf gray fox is the smallest animal of the family in North America—even smaller than the kit fox.

CHINESE FOREST TREE SEEDS AVAILABLE

A LIST of Chinese tree seeds which are available this year has been received from Mr. D. Y. Lin, of the College of Agriculture and Forestry of the University of Nanking, Nanking, China. The list contains quite a few new species for which orders will be taken up for the 1920 crop, subject, of course, to the usual conditions. Descriptions of these species can be found in Bailey's Encyclopedia of Horticulture. Inquiries for any other kinds of Chinese seeds will be welcome. The seed collection this year totals tons, the largest share of which will be demanded by forest nurseries managed by Chinese, and by extensive Chinese nurseries. The profits from the business are all devoted to the furthering of forestry in China.

Prices are quoted in gold, per pound:

<i>Acer buergerianum</i>	\$.80
<i>Acer trididum</i>.....	.80
<i>Aleurites cordata</i>.....	.30
<i>Camellia chinensis</i>.....	.40
<i>Castanea vulgaris</i> , 1920—	
<i>Cedrella sinensis</i>	2.50
<i>Celtis chinensis</i>.....	.40
<i>Cinnamanum camphora</i>.....	.60
<i>Dalbergia hupeana</i>	1.00
<i>Ginkgo biloba</i>.....	.15
<i>Gleditsia sinensis</i>.....	.50
<i>Juglans regia</i> —var. <i>sinensis</i>.....	.15
<i>Koelreuteria apiculata</i>	1.00
<i>Ligustrum lucidum</i>.....	.10
<i>Liquidambar formosana</i>	1.50
<i>Melia azederach</i>.....	.20
<i>Pistacia chinensis</i>.....	.30
<i>Pterocarya stenoptera</i>.....	.40
<i>Quercus</i> , 1920—	
<i>Sapium sebiferum</i>.....	.20
<i>Sophora japonica</i>.....	.40
<i>Sterculia plantanifolia</i>.....	.30
<i>Ulmus parvifolia</i>	1.00
<i>Ulmus acuminata</i>.....	.60
<i>Zelkova acuminata</i>.....	.75
<i>Cryptomeria japonica</i>	1.00
<i>Cunninghamia lanceolata</i>	1.00
<i>Pinus armandi</i>.....	.50
<i>Pinus massoniana</i>.....	.50
<i>Thuja orientalis</i>.....	.40

The prices quoted are for seed only. Parcel post costs 12 cents, gold, per pound, and parcels up to 50 pounds can be sent. All parcels are forwarded from the United States Postal Agency, Shanghai. Parcel post is usually cheaper than express, though they can be sent in care of the American Express Company, Shanghai, if desired. Four to eight weeks are required. A cost charge is made for bags and packing. Bills may be paid, when presented, to Mr. Russell Carter, Treasurer, University of Nanking, 156 Fifth Avenue, New York City, thus greatly simplifying accounting and payments.

All possible care is taken in the collecting and handling of seeds, as well as in packing and shipping, though of necessity we can not guarantee condition of seed upon arrival. Application for seed should be made to Mr. Lin, at Nanking, as above.

FOREST CONSERVATION BY BETTER UTILIZATION*

BY OVID M. BUTLER,

ASSISTANT DIRECTOR, UNITED STATES FOREST PRODUCTS LABORATORY

STRIPPED of ramifying and controversial details, the forest problem comes down to the need of providing timber to meet the forthcoming requirements of the wood-using industries of the country. There are two main lines along which that problem is to be met. One is by protecting the remaining forests and forest lands from fire and other natural destroying agencies and by bringing back to timber production cut-over forest land suitable chiefly for timber production. The other is by the conservation of the merchantable timber now standing by better utilization of the natural cut, or expressed in a different way, the curtailment of the annual drain upon the forests by more complete and scientific use of the trees cut. Concerted action in both directions is essential. Much has been written within the past twelve months about the ways and means of procedure under the first method and it has been the storm center of advocates of different forest policies. The second course has not been given as prominent mention or consideration as its remedial possibilities merit.

It is in connection with this latter phase of the subject that this statement has to do. But there is one point applying with equal force to forest production and forest conservation, which should first be mentioned because men whose business and financial interests are tied up in wood-using industries can well give it thought. A common reaction of the business man to the forest problem is that it is essentially a piece of uplift work for the benefit of future generations. That is not the case, especially if you will consider immediate benefits to be derived from possible accomplishments in the field of lumber conservation and utilization. Nor is it true of timber production. Great scarcity of timber supplies reacts upon the value of the established wood-using plants dependent upon those supplies. As the forest becomes more and more distant from the factory, there is a potential force at work pressing down the value of the plant and when the time arrives when it is necessary to depend upon the Pacific slope for timber to keep the factory in Pennsylvania or Indiana running, that force is going to register with somewhat of a shock.

Merely as an example, let us take the furniture industry at Grand Rapids established at a time when the forests were almost on the outskirts of the city. It has become the greatest furniture manufacturing point in the country but instead of millions of acres of forests immediately tributary, the State of Michigan today is practically cut out and one-third of its land is unproductive and a waste. The industries established when forests were close at hand are now drawing upon forests bordering the Gulf of Mexico. There are in the State of

Michigan today ten million acres of unproductive forest land, which once bore the finest forests of the country. These lands are reverting to the State, for non-payment of taxes, at the rate of 3000 acres a month. Already over two million acres have thus gone into bankruptcy. I submit for your thought whether or not the value of those great furniture plants in and around Grand Rapids would be enhanced today by a good crop of merchantable timber growing on those lands.

But the timber is not there and it will be said the planting of those lands with young trees will be of benefit only to future generations. I believe that if all or a part of those lands were planted and were today supporting a young stand of thrifty trees,—a potential forest instead of a waste of brush and weeds—it would at once add stability to every plant investment originally underwritten by a once strong forest reserve insurance, which is now rapidly going into the hands of a receiver. It would enhance the credit strength of these plants, possibly not a great deal at once, but to an increasing amount as time goes on because when your plant must draw on supplies one to two thousand miles distant with all the intervening possibilities of transportation disruption, its sale or collateral value automatically shrinks.

Turning now to the question of better utilization of the timber which we cut each year: The man with a dollar in the bank can do infinitely more and do it quicker with that dollar than can the man who has first to earn his dollar. That is essentially the advantage, from the practical standpoint of getting results quickly, which those who direct their energies upon conservation have over those devoting themselves to timber production. It appeals to me that it is easier to make one tree which you have in hand do the work of two than to raise two trees of which the seed is not yet planted. This seems especially true when we consider that less than half of every tree cut in the forest is fully utilized. The Madison Section of the Society of American Foresters has been giving some study to the place of utilization in a national forest policy and the statistics which follow have in part been assembled by its forestry committee.

According to the best figures available, our present consumption of lumber is around 40 billion board feet. To put this amount of timber on the markets and in your factory requires the cutting in the woods of possibly 75 billion feet of standing timber. There is an inevitable waste between the tree and the market and it would be foolish to even speculate upon saving all of this waste under present economic conditions in most of our country, but there are places where it seems wholly feasible and practicable to bring about large savings and thus to relieve the drain upon the growing timber we have in hand. A few of these possibilities will be named,

* Presented at the organization meeting of the Association of Wood-Using Industries, held at Chicago, September 28, 1920.

more to suggest the profitable and practical field which lies ahead.

Since we are considering the general subject of making timber last longer, it is perhaps proper to mention first the possibilities of timber preservation. Of ties alone the railroad and electric lines of this country use approximately 120 million a year of which about 28 per cent are treated. The average life of a railroad tie properly treated is 15 years; of an untreated tie about 7½ years. If all ties were treated the average consumption would thus be reduced one-half or to 42½ million ties, a saving of over 1½ billion board feet. In its report of 1920 the Tie Committee of the American Railway Engineering Association estimates the saving would be somewhat greater or about two billion board feet.

Railroad ties, however, are not the only wood products subject to profitable preservative treatment. If we include in addition poles, posts, piles, mine props, shingles and lumber used under conditions much subject to decay, the annual saving by the application of efficient preservative practice would amount to some 6 billion board feet. It is too much to expect of human nature that every stick of timber which technically ought to be treated will be treated but it is within the realm of reason to save some 4 or 5 billion feet of timber by extending standard treating practice.

Segregating the secondary wood-using industries which can use large quantities of cut-up or dimension stock, it is found that their total consumption amounts to 8 or 9 billion feet. Deducting 25 per cent to cover the large dimension sizes bought in standard lumber dimensions, there remains some 5 or 6 billion feet of small dimension stock. For the most part this stock comes from standard lumber sizes and to that extent diverts standard lumber sizes from uses requiring standard dimensions. How much of this small dimension stock might be made up by closer utilization at the mills or by interchanged utilization among the wood-using industries it is impossible to say, but there is a great field here for conservation by developing a more intense manufacturing of slabs, edgings, crooked, small and defective logs now wasted. It has been estimated that all requirements for this small dimension stock could be met from timber now wasted. If that is the case it would reduce the present drain upon our forests some 5 or 6 billion feet.

The forest requirements of the paper industry of the United States amounts to some 6 million cords annually of which about 4 million cords are utilized by processes other than groundwood pulp. We are leaning on Canada for 20 per cent of this supply. The best utilization that has thus far been accomplished under chemical processes is 45 per cent of the wood substance. Thus for every cord of wood pulped by these processes some 55 per cent of the original weight of the wood is lost. In terms of our annual consumption of pulpwood this amounts to over 2 million cords. It is the usual practice for pulp mills to store their wood over considerable periods and recent investigations indicate that improper methods of storing result in an actual wood loss of 10 or 15 per cent in the weight of the wood. This means an annual

loss to the industry and to the nation of 575,000 tons of pulpwood with a valuation of over \$11,000,000. But the waste of pulpwood does not end here. The raw wood is converted into groundwood pulp, and much of it must necessarily be ground during periods of high water then held in storage. Infection with consequent decay is apt to occur causing a large annual loss estimated by the industry at \$5,000,000 annually. Thus systematic studies to develop most efficient practices in this field, should further reduce the present drain upon our timber in hand.

It has been estimated that there is an annual loss exceeding one billion feet in the seasoning of lumber. While this may not be a complete loss in the sense that the lumber cannot be used, it is a drain upon higher quality material and contributes directly to the accumulation of low grade and less usable lumber. By the introduction of proper methods of kiln drying, it should be possible eventually to cut that loss in two. Similarly in the steam bending of material going into furniture, vehicles, etc., there is a large loss of high quality lumber much of which it would be possible to save by systematic studies and investigation to determine how various species can be bent with minimum loss. The great box industry using some four and a half billion feet of lumber annually, offers another field for relieving the annual drain upon our forests. This industry is already engaged in the development of boxes which will not contain more lumber than is necessary to serve the purpose. What saving would be possible in this field cannot, of course, be estimated but during the war boxes which were tested at the Forest Products Laboratory and then redesigned on lines of balanced construction showed savings in lumber ranging from 20 to 40 per cent. This, of course, is very much higher than would be shown for the average commercial box.

Every year our forest principal is being reduced uselessly by some 4 or 5 billion feet destroyed by fire and other natural agencies. This loss, of course, should be reduced to a minimum and while it possibly does not come under the category of conservation by better utilization, it is a source of loss that should have the active attention of every industry using or dependent upon wood.

There is undoubtedly a great volume of wood which goes into the waste heap at various wood-using factories which is subject to salvage through some sort of a wood-waste exchange or clearing house of information established by the industries themselves. This would lead unquestionably to much material, which is now scrapped, finding a market elsewhere. There are today many industries using grades of wood which are being burned as waste in other industries. This is due to ignorance of wood-using requirements and the lack of an effective medium by which different factories or industries may gain a clear idea of relative market requirements and the possibilities either of acquiring waste lumber from other industries or of disposing of their own waste to factories which can use it.

It would be possible to go on touching the various

(Continued on page 691)

WITH A PUBLISHER PRESIDENT EDITORS

EDITORS of the nation are expressing hopes that the next President of the United States will direct his efforts toward bringing about the adoption of a National Forest policy. The statement sent out by the American Forestry Association congratulating the country on the fact that the next President would be a publisher met with instant editorial response, some of which we can show in this issue. The *Chicago Tribune* devoted one of its editorials to the subject and this is on the cover of this magazine. The co-operation of the newspaper editors with the American Forestry Association is gathering momentum for the big drive that will follow the election. Some of the comment follows:

Sacramento Union: When the proper balance is struck by the discerning historian, who writes the annals of our present epoch, he will not fail to put the proper emphasis on the political recognition of our economic needs as embodied in legislation conserving the natural resources of the country.

Such a historian will find that such measures found scarcely any space in our statute books until near the dawn of the twentieth century. And he will find the presence of such laws coincident with the decline of our free land and the need for the intensive development of a settled country. Unless such a historian is also a philosophic student of human nature he will express great astonishment at the careless and prodigal wastage of our natural resources marking the first century of our development. It is not an exciting issue and it is certainly not political in any of its aspects, but if the next administration should adopt a sound and constructive program for the restoration of our forests its niche in the history of useful accomplishments would be indelibly secure.

Charles L. Pack, president of the American Forestry Association, pertinently points out that the next President will be a man who through his business connections will thoroughly appreciate the necessity of such a policy. Both the candidates have always secured their livelihood as newspapermen, and both are now active publishers. The present shortage of pulp wood for print paper is painful evidence of the shortage of timber now being faced by this continent.

Our depleted forests are now growing only one-fourth of the amount of timber

annually consumed by the various industries which must have wood. The situation is not only critical, but absolutely hopeless unless the national government intervenes with a constructive program for reforestation.

Canton News: The next President of the United States can put his name in the hall of fame if he will "start something" looking towards a constructive policy in the conservation of forests, according to the opinion of Charles Lathrop Pack, president of the American Forestry Association.

Forest lands are being denuded of their timber, but nothing of a definite character

serious hardship to many publishers and imposing heavy costs upon others.

Both Senator Harding and Governor Cox are newspaper publishers, and they are passing through the experience of practically every newspaper in the United States. Perhaps either of them will feel so strongly on the subject, if elected, that he will not be satisfied to delay the adoption of a conservation policy any longer than is necessary.

New York Commercial and Financial Chronicle: Now is the time of year when there are more persons in the forests for pleasure than at any other season. On this account there are more persons thinking of the forests than in ordinary times. Therefore this is the best of times to call attention to what is necessary to be done, and done without delay, if our forests are not soon to vanish from the earth. The gospel of forestry and reforestation is not a matter of times and seasons; it is for all times and all seasons. But in summer it ought to be easier to arouse interest in it.

Hence the call should be louder and more insistent than ever right now. Let us all resolve here and now to strive more vigorously than ever to save the forests we love so well, the forests that have sheltered us from the heat in our vacations, and given us some of the greatest pleasures of our lives. A program with this end in view has been outlined in the form of demands for action by national and state legislatures by the forestry committee of the American Paper and Pulp Association, and this has been indorsed by the AMERICAN FORESTRY Magazine.

Troy Record: Paper manufacturers and forest experts of the United States and Canada are meeting at a psychological moment in New London, New Hampshire, for discussion of forest protection. The matter of forest protection is always timely, but at this moment more than two hundred and fifty forest fires in the district south of the Campbell River in British Columbia have been reported. Scores of these are still raging, causing the destruction of thousands of feet of timber.

Speaking before the New London Conference, Charles Lathrop Pack, president of the American Forestry Association, declared that "our mature forests are not only being wiped out by destructive conflagrations as well as by numerous small fires, but these fires also prevent the natural reforestation of acres of cut-over lands." Forest protection is a very serious matter. Mr. Pack calls attention to the

POINTING A LESSON

Paterson (N. J.) Press Guardian

Perhaps no more unique memorial was erected to Abraham Lincoln than when John Finn of Decorah, Iowa, went into the woods and found a hackberry shoot which he transplanted in front of his home following the assassination of the President. The tree has been nominated for a place in the Hall of Fame for trees with a history which is being compiled by the American Forestry Association at Washington.

That tree teaches a powerful lesson as to what could be done toward correcting the forestry situation in this country. Fifty-five years seems a long time to look ahead but John Finn can span the years and span them quickly. There stands the tree, a towering lesson and a warning.

America must wake up and have forest crops just as the country has wheat and corn coming every year. The way to do that is to have an intelligent national forest policy.

is being done to insure that these forests will be restored for the use of future generations. In pioneer days the important thing was to strip the land of timber for agricultural purposes, and the nation knows how well it was done.

President Pack is hopeful that the next President of the United States will have a practical appreciation of the importance of a national policy that will conserve the timber that is left in the nation, and that he will urge upon Congress the necessity of action that will protect the remaining forests from devastation.

Great quantities of the softer woods, such as spruce, are used annually in the manufacture of wood pulp, a considerable part of which is converted into white paper for newspaper printing. The difficulty of getting this pulp is at present working

SEE A NATIONAL FOREST POLICY

fact that lumber prices have jumped 300 per cent since 1914. Senator Harding likewise has noted this fact and pointed out the relation of an adequate national lumber supply to the housing problem. An inadequate lumber supply means higher lumber prices and consequently less building. Curtailment of building is detrimental to the American home as well as to the development of the American city.

The newsprint trade is also affected by the curtailment of the lumber supply. The Editor and Publisher, for example, says: "Figures compiled by the American Forestry Association reveal that the New England States are no longer self-supporting in a lumber way, that the Lake States, once our greatest producers of lumber are now importing to keep alive the many wood using industries in that section; that the supply of virgin pine in the South will be exhausted at the present rate of consumption in 15 years, and that the center of the lumber industry is rapidly moving to the Pacific Coast. This, of course, means longer hauls and higher freight. It means scarcer, dearer newsprint. It means scarcer, dearer lumber for every purpose. In reforestation lies the only salvation."

Fortunately not only Senator Harding but also Governor Cox have both recognized the essential need for a national program to restore the forest lands to productivity. Hence we may reasonably expect that the matter will be brought before the next session of Congress and an adequate forest policy perhaps formulated before the forests are so depleted as to cause serious embarrassment to the nation.

Portland Oregonian: The American Forestry Association shows in its official publication that there is a movement well under way to restore the timber of the country before it is too late. Reforestation, it is said, is actually under way. The story of the taming of every wilderness has been a story of waste indispensable under prevailing circumstances.

That events have a way of righting themselves is indicated by the reforestation campaign. It remains only to conduct it with the same energy that characterized the work of those early settlers to make good a great part of the loss within a measurable term of years.

Trenton (N. J.) Advertiser: Since it takes from 60 to 100 years to produce forest trees of commercial size, private owners of timberlands are not likely to be interested in forest reproduction as an investment, the American Forestry Association

points out. The relationship of timbered areas to future needs; their incentive to tourist travel; the fact that they serve as water reservoirs, etc., make the public vitally interested in seeing them continued and for this reason state and national acquirement of logged-off areas and protection of such areas against fire is proposed as the solution of the continued timber supply problem.

Unless immediate forestry steps are taken—and taken in considerable magnitude—a

"THAT IS NOT ALL"

Rochester Democrat-Chronicle

Announcement is made that official indorsement of the New York State big tree competition, which is being conducted by the State College of Forestry, has been given by the American Forestry Association. In writing official approval of the idea, the Association secretary said: "This is a great stunt, this search for the biggest tree in New York State. The American Forestry Association has several claims for the largest tree from several states, and if you wish, we will enter the winner of the New York State competition in the national contest. We shall be very glad to co-operate with you, for we believe that the development of an interest in the individual tree does much to bring the public to appreciate the value of the forest, as a community of trees." The idea back of the competition is clearly expressed in these words. It would be a matter of interest to locate all the biggest trees of the State and from among them find the champion. But if that were all, it would hardly be worth while. Fortunately, it is not all, and the game, if it may be called that, is eminently worth the candle. The more the public can be induced to take an interest in trees, the better it will be for the forests, and so for the public.

serious situation will confront future generations. In fact, many boys and girls of today and some mature persons as well will live to see a time of embarrassment and distress unless radical moves are made to replace the trees that are now going so rapidly into the maw of manufacturing, the appetite of which grows with consumption and becomes all the more menacing as the supply decreases.

Buffalo Commercial: Depletion of the forests of the United States within 60 to 75 years with a resultant slump in all enterprise that depends wholly, or in part on forest products can be averted if action

is taken without further delay, says the American Forestry Association of Washington, D. C.

While at the present rate of cutting it is agreed that the forests of the United States are sufficient for only 60 to 75 years, it is pointed out by forestry experts that if private organizations adopt logging methods that will protect young growth and leave logged-off lands in condition for forest renewal, the young trees of today will be of merchantable size, when needed. This is dependent on keeping fires out of the forests so that young trees will have an opportunity to grow.

Rochester Post-Express: Forest fires are burning up a vast lot of the wood we so much need. This ought to get special attention for the plea which Charles Lathrop Pack, president of the American Forestry Association, makes for protection of timber areas against fire. Here in this state under the Conservation Commission's direction a start has been made at forest protection; there are not enough signal stations nor are they properly manned, but, inadequate as the service is, it has already safeguarded the state against severe forest fire loss. While we are proposing, arguing, propagandizing about replenishing our forests, about tree planting and wood conservation, we are allowing whole areas of good timber to burn up when a good protection service might prevent this. The common sense thing to do is to do everything possible to keep safely the timber supply that we have.

Milwaukee Sentinel: Charles Lathrop Pack, president of the American Forestry Association, in a recent statement, calls attention forcefully to the necessity for a constructive national forest policy, which, he asserts, is imperative if the complete denudation of American forests in the near future is to be avoided. Some impressive figures are cited by Mr. Pack, who points out that the virgin forests of the United States covered 822,000,000 acres and they are now shrunk to one-sixth that area. The relation of wooded areas to future needs of the country, their incentive to tourist travel; the fact that they serve as water reservoirs and many other reasons make it a matter of public interest to see that some methods of conservation that are intelligent and workable are arrived at.

It is matter of grave concern and its importance can not be too strongly urged on the people and the officials of the government. Under proper conditions the forest resources of the country can be made to last forever.

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

MORGANTOWN, PA.

By Caernarvon Schools: Lieut. George H. Zellers.

PHILADELPHIA, PA.

By Boy Scouts of America, Troop 207: John P. Bartlett, Corp. Charles L. Beatty, Cornelius Boyle, Lieut. James V. Devenny, John J. Earner, William Hedges, Sgt. Paul Henkels, Edward Malone, Lt. William McGoochan, John Potterton, Capt. John J. Tuohy, Wm. J. Turner, James E. Murphy, Horace O'Donnell. By Women's Homeopathic Hospital: Dr. G. Walter H. Conrad.

SCRANTON, PA.

By Mr. and Mrs. E. E. Hollister: Charles M. Hollister. By Mrs. O. S. Clark: Daniel M. Clark, Mrs. Bena Erhardt, Ralph Miller. By Mrs. H. M. Wilcox: Lloyd G. Wilcox, Mrs. Rosa Seeley, Harold D. Seeley, Mrs. G. M. Dewey, Sgt. Theodore R. Dewey. By Mr. J. Lewis, Romaine Lewis. By Mr. and Mrs. W. S. Fessenden, Sgt. Guy A. Fessenden. By Scranton Bird Club and By Century Club: Eugenia C. Hosie. Mr. and Mrs. Arthur Warner, Clarence E. Warner. Mrs. Sara Curry, John W. Curry. Mr. Joseph Huss, Edward Huss. Mr. John Cawley, Peter Joseph Cawley. Mr. and Mrs. J. D. Peckham, Sgt. Homer L. Peckham. Mrs. H. M. Hannah, Fred A. Hannah. Mr. and Mrs. J. T. Maloney, Martin J. Maloney. By Mrs. Catharine Hopkins, Corp. Leo A. Hopkins. Mrs. Howell Harris, Corp. Walter W. Harris. Mrs. Ann Forkin, James A. Forkin. Mr. and Mrs. Samuel Roberts, David W. Roberts. Mrs. W. T. Parry, William T. Parry.

WARREN, PA.

By Memorial Park Committee: Sterling E. Rowland, Percy E. Lawson, Archie W. Westling, Rex D. Walker, Fred Schwing, Axel T. Anderson, Ernest Anderson, Homer B. Eccles, Fred D. Mahaffey, Franklin L. Mattison, Elzie A. Lynch, Oliver J. Summerton, Robert Halcolm Eadie, Lieut. Donald D. McAlpine, Lieut. Stephen Paul Hoskins, Herman W. Hertz, Stanley H. Smith, Henry H. Cumings, Leo Leosky, John H. Rylander, R. H. Carr, Floyd H. English, Glen Spetz, Sterl Atkins, Harry M. York, Clyde F. Jones, Ray C. Bines, George W. Neaves, John F. Spangler, Charles F. White, Louie J. Siefert, Stanley L. Wagner, Frederick L. Howard, Robert D. Shaw, Frank M. Glendenning, Robert B. Kilburn, Chester

T. Sampson, Alfred T. Morrison, Garnet M. Noyes, Chester Munkegard, Oscar F. Johnson, Charles F. Swanson, Oran Kale, Edward F. Koebley, Wilbur Oleson, Carl A. Engdahl, John F. Cooke, Clyde F. Manwaring, James Uber, Clayton Skiff, William J. Clancy, Randall S. Houghton, Frank Burgland, Clarence P. Spetz, Ernest Crider, Richard E. Howard, Francis Nichols, Ralph H. Wood, William Van Ord, George W. Mead, Arthur Hagle, Claude H. Rahn, Robert B. Stuart, Clair Brady, Stanley E. Sutton, Rehl H. Carr, Harry Haley, Edward Ryberg, Frank Raisor, Henry W. Hallgren.

NASHVILLE, TENN.

By J. K. Raines' School: Mayor Gupton, Corp. A. N. White, James W. Turbeville, J. H. Bradford, Mrs. J. K. Raines, Clyde English, Mrs. G. H. Williams.

DALLAS, TEXAS

By Travis School: Wendell Spake. By O. M. Roberts School: Joe W. McNeill.

LYNCHBURG, VA.

By Lynchburg Chapter, D. A. R.; William Alexander, Samuel Marvin Arthur, Lonnie Joseph Bacon, Felix Longdale Banton, Lieut. Howard T. Barger, Col. Charles H. Blackford, Wm. Harrison Brooks, Joseph B. Brown, L. Harry Bryant, Lieut. Beverly J. Burks, Lieut. Robert Lewis Butler, Lieut. Herbert Butts, Lieut. Allen L. Campbell, W. Offutt Cobbs, Jacob Lorenzo Crist, Volney Eugene Cumbie, Lieut. G. B. J. Duval, Jr., Samuel Fallwell, Thos. Eugene Fallwell, Louis C. Fernald, Guy V. Finch, Lieut. Saunders Flemming, Harry Lee Foster, Ivan H. Fowler, Robert Franklin, William Gibson, Lieut. Geo. Preston Glenn, Fred Geo. Goepfert, Marvin Gough, John Randolph Harmon, Robert Henry, W. W. Hillman, Robinson Crusoe Johnson, John H. Johnston, Pannel Rucker Jones, Robert Lee Kessler, William G. Ketterer, Lieut. John Kirkpatrick, Jacob K. Klein, Haynard Kuck, George Lash, Charles L. Locker, Andrew J. Lucas, Robert L. Mayer, Robert A. Mays, Alexander Mier, Walter Mitchell, A. Marvin Moon, Sterns Moon, John J. Murphy, Lieut. Wm. O. Neubauer, Orlie L. Ore, Thomas Ore, Lieut. Reuben L. Paskiel, Richard W. Pendleton, Robert L. Perrow, Jr., Carrington Price, Geo. G. Printup, Jr., Ambrose B. Shenk, Eezer Snell, Jr., Robert B. Stamples, Carrington Stevens, Charles Evans Stone, Frank Hamilton Stone,

W. Austin Thompson, Norman J. Traylor, Harry R. Walker, Clarence Widdifield, Major John H. Wills, Abner Odel Witt.

SEATTLE, WASH.

By University of Washington: Lawrence W. Allen, Jeannette V. Barrows, Alfred J. Bradford, Leo F. Bennett, Donald Broxon, Herbert F. Canfield, A. E. Carlson, Lloyd H. Cochran, Dow R. Cope, Edward S. Cunningham, William R. Cutler, Walter C. Dunbar, James M. Eagleson, George Vernon Evans, Albert Morrill Farmer, Charles N. Fletcher, Samuel Goodlick, George F. Gorham, Rhodes H. Gustafson, Nicholas C. Healy, Clarence J. Hemphill, Alfred C. Hoiby, Everett Hoke, E. H. Hoisington, Frank H. Hubbard, Edward H. Hughes, Clair Kinney, Harry Leavitt, Wilfred Lewis, Charles A. Lindberry, John Martin, Adelbert D. McCleverty, William J. A. McDonald, Frank Everett McNett, Wilmot C. Morehouse, Roy Muncester, Elmer J. Noble, Merle O'Rear, Samuel Parker, Gerald G. Patton, Lester D. Pickering, H. A. Ross, James R. Ristine, W. Earl Shanley, Truman S. Tucker, Homer W. Ward, Leon H. Wheeler, Harold C. White, Chester Wilson.

SOUTH BEND, WASH.

By Memorial Tree Committee: Walter Baltus, David G. Benton, Horace B. Dorrien, Walter Drissler, Don R. Grable, Werner J. Hill, William W. Hyatt, Victor H. Johnson, Dan C. Kelly, John A. Laako, Lewis Olof Larsen, Christian Moe, Henrick W. Niemi, Russel R. Owens, Howard Perkins, Alfred W. Petit, Tom Shelse, James C. Souter, Steiner Siverson, Jacob Teiseth, Thomas O. Williams, William Roy Willson, Joseph Zurfluh, Jacob Barger.

WHEELING, W. VA.

By Service Star Legion: Edward Tate.

FOND DU LAC, WIS.

By Woman's Club: World War Veterans.

LA CROSSE, WIS.

By Service Star Legion: Soldiers, Sailors and Nurses.

MIDDLETOWN, WIS.

By Middletown High School, Class of 1912: Franklin W. Haverland. By Middletown Women's Club: Harry T. Curwen. By Middletown Lodge F. A. M.: William C. Steckelberg. By Middletown I. O. O. F. No. 158: Berton O. Haak.

REFORESTATION, A PUBLIC, NOT A PRIVATE DUTY

"**L**UMBERMEN cannot be justly criticized for not replanting their lands," says Professor John Ise, in his recent book "The United States Forest Policy," published by Yale University Press. "Only under exceptional circumstances could it be done profitably. In the first place, an investment of this character would be a long-time investment. No return could ordinarily be expected in less than 50 years, and in some cases even longer, and in the meantime the owner must pay taxes and protect his investment from fire and trespass. Although these two items—fire protection and taxes—are not large, they are too uncertain for a conservative investment. While fire protection is a small item usually, there is always a chance that fire may destroy a part of the entire investment. Taxes are likewise uncertain and arbitrary and, under the unsystematic prevailing in most states, must be paid regardless of whether the lands are bringing in any return or not.

"Even if there were no element of uncertainty, reforestation would seldom present an attractive field of investment. The initial cost of reforesting, together with cost of protection and taxes, compounded annually for 50 years at six per cent, would amount to a very large sum, in all probability much more than the stumpage would then be worth. One writer on the subject has termed tree planting 'a risky six per cent investment.'"

THE PULP AND PAPER INDUSTRY*

BY GEORGE W. SISSON, JR.

PRESIDENT OF THE AMERICAN PULP AND PAPER ASSOCIATION

IT is no news that both this country and Canada have but recently awakened to the actual and critical situation that faces the pulp and paper industry. This realization has come as somewhat of a shock to many and to the general public who have in the past paid little or no attention to the matter so long as their needs were served. It would doubtless be true to say that the alarm over the pulpwood situation, while well founded, has been somewhat over-done so far as its psychological effect on the wood, the pulp and the paper market is concerned. It is no time for either the industry or the public to lose their heads, but rather to make a careful and honest survey of the situation and evolve from this study some policy that will, perhaps, not correct the trouble very soon, but through which the crisis can be tided over and an ultimate and permanent solution found within a reasonable length of time.

Pulp and paper manufacturing is the one great industry using wood in which there is much hope for the practice of forestry as a commercial undertaking upon privately owned lands. Hence it is to the pulp and paper industry that professional foresters have turned most hopefully for the practical application of their principles and it is gratifying to note that many manufacturers of pulp and paper have excellently qualified foresters upon their staffs and are not only making special provisions to protect their timber lands from fire, but are engaging in planting operations with the definite purpose of providing a future supply of wood for their mills.

However, the insufficiency of private action and in a single wood using industry is readily apparent and the necessity for a nation-wide program embracing all phases of our forest resources and their utilization is clearly recognized.

It is with this thought in mind that the American Paper and Pulp Association, through its Committee on Forest Conservation, considered this matter. Our committee gave most painstaking and thorough study to the many phases of the question and submitted to our industry a preliminary report in November, 1919, following it with a most complete and definite report and recommendations for a National Forestry Policy with suggestions for legislation, both State and Federal, to make the plans effective. These reports met with surprisingly favorable comment the country over. They deal in a sane and effective manner with the fundamental principles involved in the solution of the problem of so handling the forests of this country that they will support properly the industries dependent upon them. I venture to say that up to that time no more careful and exhaustive study of this matter had been made and certainly no more well considered and actually practical

plans that should unite all interests had ever been presented.

Briefly summarized the program calls for:

Permanent annual Federal appropriations to be expended directly and in co-operation with the several States for the adequate protection, management and reproduction of existing forests and the planting of treeless areas; complete and accurate forest surveys and land classifications; a consistent and continuing policy of public acquirement of forest areas on watersheds of navigable streams and of other areas suitable only for timber growing wherever best adapted to State or Federal management; the extension of general authority to the Secretary of Agriculture to exchange National Forest Land or stumpage for private timbered or cut-over land within or adjacent to National Forests; and a broad policy of forest research and investigation.

In addition to such Federal action our committee recommended such State legislation as would embody policies harmonizing with those suggested for the Federal Government but applicable to the special needs of the several States.

Bills covering the principal features of this program are now being prepared for introduction in the National Congress and State Legislatures and it is the confident hope that this truly constructive program will be made effective very shortly.

I shall not attempt to discuss the possibilities of pulp and paper development in new regions like Alaska or other locations where recent investigations have been conducted, as our immediate problem is that of serving an already established industry and meeting the emergency in localities where we thoroughly believe steps can be taken to perpetuate those industries and guarantee the continued existence of prosperous industrial centers which are the homes of busy and happy American citizens.

In the northeastern States, where the pulp and paper industry is concentrated to a degree found in no other section of an equal area and where the forests had been heavily overcut for many years in the lumber industry even before the paper mills began to take their toll, there are perhaps more pressing reasons for some immediate or early form of relief if the industry is to continue. It is certain that within this area the industry cannot operate at full capacity without the importation of a large percentage of its wood, and the condition of the forests demands immediate attention in the direction of a program of protection and reforestation, from which permanent relief can be expected.

It is a fundamental economic principle in the life of a nation that all land must be made as productive as its character will permit and that the land that produces a crop of timber, though it will be once in 25 or even 50

years, is as deserving of the consideration and help of the State as is the land that produces its annual crop of foodstuffs and which receives, and properly so, the solicitous care of our Government.

While this program, both State and National, may hold out hope for the future in making permanent the industries utilizing forest products, it would be futile and holding out false hopes if the general public were led to believe that the present actual shortage in pulp and paper products could be easily and quickly relieved. Whatever steps are taken, whether temporary, or forward-looking, there will inevitably be necessity for economy in the use of paper, and the publishers and users of paper will display not only regard for the public welfare, but intelligent selfishness so far as their own interests are concerned, if they will co-operate in a movement to avoid waste in every manner that will not jeopardize their real service to the general public.

I can speak for the industry which I represent in this country in promising the hearty co-operation and practical help of the industry to all bodies and agencies that are approaching this subject in the same spirit as I have outlined.

No consideration of the pulpwood supply for American mills would be complete unless note were taken of the Canadian situation from which source large quantities of this raw material have come in the past and are still coming. The growing realization by Canada that her own pulpwood resources are not unlimited must be her excuse for not only prohibiting the export of unmanufactured pulpwood from Crown Lands, but to seriously suggest an embargo on wood from private lands also. I have no intention of entering into discussion of the merits of this situation other than to quote from my own remarks at the last convention of the American Pulp and Paper Association:

"The markets of America have been freely opened to the products of Canadian mills and the industry there owes its phenomenal development to that fact. It is further true that Canadian industry must have American coal of which several million tons annually are sent across the line. There should be no clashing of interests through misapprehension, but full recognition of the similarity of the problem on both sides. Co-operation on a large and magnanimous scale and in the most sympathetic spirit must be the rule if the industry is to prosper in both countries. Common fairness indicates that access to raw materials needed should not be denied on either side, and a restrictive policy in excess of what is fairly necessary for national requirements is not in accord with the co-operative spirit which must hereafter rule in international relations."

It is unfortunate indeed that some in Canada should have so misinterpreted the spirit in which the Americans have taken up this question and particularly that certain financial interests have given currency to statements that appear to question the motives and the business ethics of the Americans who even attempt to discuss the situation in a fair and dispassionate way. If those who are more interested in the financial exploitation of the industry

than in its practical building up and operation would leave the adjustment of this matter to the actual manufacturers of pulp and paper in both countries, such adjustment to be brought about by amicable business conferences, it is my opinion that some arrangement mutually satisfactory and mutually helpful could be worked out. America does not desire to rob Canada of her birthright in her pulpwood resources and no suggestion of retaliation was ever intended in the fair statement that both countries needed raw materials which are produced or exist in the other country, and that arrangements for interchange of such resources should be upon some fair plan of co-operation that would be helpful to industry on both sides of the line.

I venture to commend for most careful consideration the very practical suggestions offered by Colonel Graves as to a conference by qualified representatives of the United States and Canada and to congratulate myself that, to use the words of a noted personage, my mind has seemed to "go along" with his as to the desirability of an amicable business-like conference, undertaken in a spirit of co-operation and good will.

Speaking for the manufacturers of pulp and paper, let me give assurance of our entire readiness to assume obligation and render full measure of service in the practical execution of a program that will be continent-wide in its scope, all-embracing as to wood-using industries and dedicated in its last analysis to the permanent service of all the people.

* Extracts from an address at the New England Forestry Conference in August, 1920.

FOREST RECREATION—THE MIGHTY ROCKY MOUNTAIN TROUT

(Continued from page 664)

dollars will build and equip very nicely a small hatchery where from four to five hundred thousand fish may be hatched annually. I would favor the construction of a great number of hatcheries in our mountains rather than just a few large ones. By this method a great deal can be saved in transportation of eggs and hatch, and each locality would be in a position to better know just how many fish can be taken and supported. If the whole United States goes fishing, and certainly it should, we will need these hatcheries by thousands. I will venture the statement that every mountain stream in the United States will need have several traps and one hatchery sufficiently large to handle all the fish trapped on the drainage.

Next summer when you come to the mountains for that trout, remember his struggle for existence, his innocence, his value, and let not one be wasted. Remember, if you are fortunate enough to camp within one of the National Forests, that there are a number of brown skinned men who know nothing of an eight-hour day working, perhaps within a few miles of you, who will willingly tell you more of your playground and the denizens of stream and forest.

MAPLE SUGAR IN COLONIAL TIMES

BY LAURENCE R. GROSE

DEPARTMENT OF FORESTRY, BATES COLLEGE

IN THESE times of sugar shortage, we read with especial interest certain remarks on maple sugar that come down to us from Tench Coxe, worthy citizen of Philadelphia in Revolutionary times. Coxe was a patriot, an amateur political economist, but above all a promoter; and the enterprise he was promoting was nothing less than the United States of America, in the cause of whose prosperity he turned his ready pen to account. It is in the pages of his "View of the United States" (Philadelphia, 1794) that we come across his "estimate of the capacity of sugar maple lands of Pennsylvania and New York to supply the demand of the United States for sugar and molasses.

"The information of William Cooper, Esquire, of Cooperstown," says he, in developing his estimate, "is that there are easily made from a tree five pounds weight of sugar, and that there are fifty trees on an acre at a medium; but suppose only four pounds to be produced by a tree and forty trees on an acre,—and supposing the whole demand of the Union, 42,084,140 pounds, then 263,000 acres will yield a supply for the United States. It need not be observed that there are very many more than 263,000 acres of sugar maple lands in each of the eight following counties: (in New York) Albany, Montgomery, Otsego, Tyoga, Ontario; and (in Pennsylvania) Northampton, Luzerne, and Northumberland. Also that the sugar maple tree is found in many other parts of those two states, and of the United States.

"It will be frankly admitted that the result of the above estimate has a wild and visionary appearance; but as it is made upon facts, very carefully ascertained, and as the whole calculation is exposed to examination, it will not be unreasonable to give some faith to it, until exaggeration of fact or error shall be pointed out."

This was in 1790. A year or two later, Coxe satisfied himself that the total consumption of sugar and molasses in the United States was 26,000,000 pounds. "It is certain," he writes, "that every farmer having one hundred acres of sugar maple land, in a state of ordinary American improvement (that is, one-third covered with judicious reserves of wood and timber, and two-thirds cleared for culture of grass and grain), can make one thousand pounds weight of sugar with only his necessary farming and kitchen utensils, if his family consists of a man, a woman and a child of ten years, including himself. It would therefore require the attention of 26,000 of such small families occupying (at one hundred acres each) 2,600,000 acres of those lands to make (at 1,000 pounds each) 26,000,000 of pounds, or a quantity of sugar equal to all the molasses and sugar, annually consumed in substance in the United States. The operation in a family is as easy as to make household soap or cheese, or to brew ale or beer, and as there is in this

country much more than twice the above quantity of sugar maple land, in situations not too southern, the only object that requires attention is to give, as fast as possible, generality to this simple, profitable, and comfortable manufacture." And he adds that the people of Pennsylvania had already paid considerable attention to the possibilities of this manufacture, especially since "the great and increasing dislike to negro slavery, and to the African trade among the people of that state, occasioned this new prospect of obtaining a sugar, not made by the unhappy blacks, to be particularly interesting to them."

In writing so of maple sugar, Coxe was doubtless adopting information and suggestion from Benjamin Rush, a famous Philadelphia surgeon and chemist, whose own calculations with respect to sugar, as expounded in 1791 in an open letter to "Thomas Jefferson, Esq., Secretary of State of the United States, and one of the Vice-Presidents of the American Philosophical Society," had led him to the following eloquence of prophesy: "In contemplating the present opening prospects in human affairs, I am led to expect that a material share of the happiness which Heaven seems to have prepared for a part of mankind will be derived from the manufactory and general use of maple sugar, for the benefits which I flatter myself are to result from it, will not be confined to our country. They will I hope extend themselves to the interests of humanity in the West Indies. With this view of the subject of this letter, I cannot help contemplating a sugar maple tree with a species of affection and even veneration, for I have persuaded myself to behold in it the happy means of rendering the commerce and slavery of our African brethren in the sugar Islands as unnecessary, as it has always been inhuman and unjust." Dr. Rush's letter was rightly enough addressed to Jefferson, who was known to permit the use of maple sugar alone in his household, and who even planted maples on his Virginia farm with sugar harvesting in view.

It is scarcely necessary to say that these early visions of the coming importance of maple sugar never took the shape of realities. As a source of general supply, maple sugar has never been more than a good big drop in the American sugar bucket. Yet in countless pioneer families this native sweetening was in sole and daily use; and each year since, many millions of pounds have been made.

To the settlers and to the Indians, maple sugar was an everyday matter; but to the early travelers, in search of gossip or information to retail to their eager and curious fellow-Europeans, this product was invariably a cause of wonder and remark. A long list might be made of those whose tales of journeying in America referred to the tree and its useful sap. Yet, strange to say, no one of these early references makes it clear beyond doubt

whether the Indians or the white men first discovered the uses to which the sap might be put.

The earliest reference yet discovered is of date 1684, and appeared in England in the "Philosophical Transactions of the Royal Society" as "an account of a sort of sugar made of the juice of the maple in Canada." "The savages of Canada," it reads, "in the time that the sap rises in the maple, make an incision in the tree, by which it runs out; and after they have evaporated eight pounds of the liquor there remains one pound as sweet and as much sugar as that which is got out of the canes. The savages here have practiced this art longer than any now living among them can remember." If the proverbially long memory of the red man be taken into account, this statement points certainly toward Indian priority in the use of maple sap.

It is true, in any event, that at an early date in our observation of them, the Indians made habitual use of maple sap products, as sauce, as sugar, or as beverage. Said the Baron de la Hontan, in writing of his travels in America in 1684-95, as an English translation of 1703 gives it, "The maple tree yields a sap which has a much pleasanter taste than the best lemonade or cherry-water, and makes the wholesomest drink in the world. This liquor is drawn by cutting the tree two inches deep in the wood, the cut being run sloping to the length of ten or twelve inches. At the lower end of this gash, a knife is thrust into the tree slopingly, so that the water running along the cut or gash, as through a gutter, and falling upon the knife that lies across the channel, runs out upon the knife, which has vessels plac'd underneath to receive it. Some trees will yield five or six bottles of this water a day; and some inhabitants of Canada, might draw twenty hogshead of it in one day, if they would thus cut and notch all the maples of their respective plantations. The gash do's no harm to the tree. Of this sap they make sugar and syrup which is so valuable that there can't be a better remedy for fortifying the stomach. 'Tis but few of the inhabitants that have the patience to make maple-water, for as common and usual things are always slighted, so there's scarce any body but children that give themselves the trouble of gashing these trees."

According to an Algonkian legend, had it not been for the interference of the immortals, we should have had syrup and not thin drinkable sap direct from the tree. "One day," this legend runs, "Nokomis, the grandmother of Manabush, was in the forest and accidentally cut the bark of a tree. Seeing that a thick syrup exuded from the cut, she put her finger to the substance, and upon tasting it found it to be very sweet and agreeable. She then gave some of it to her grandson, Manabush, who liked it very much, but thought that if the syrup ran from the trees in such a state it would cause idleness among the women. He then told Nokomis that in order to give his aunts employment and keep them from idleness he would dilute the thick sap. Whereupon he took up a vessel of water and poured it over the tops of the trees, and thus reduced the sap to its present consistency.

This is why the women have to boil down the sap to make syrup."

The Indians knew and used two means of reducing the sap to syrup. One was to freeze the sap partly, and throw away the frozen portion, which was little more than plain water; the other was to boil the sap down, in whatever way they could devise. According to Lieutenant-Colonel Graham, in his sketch of Vermont published in 1797, "the method pursued by the Aborigines in making this article was as follows: Large troughs were made out of the pine tree, sufficient to contain a thousand gallons or upwards; the young Indians collected the sap into these troughs, the women in the meantime (for the men consider everything but war and hunting as beneath their dignity) made large fires for heating the stones necessary for the process; when these were fit for their purpose, they plunged them into the sap in the troughs, and continued the operation till they had boiled the sugar down to the consistence they wished." He adds: "There are two kinds of the maple tree, from which sap is taken. One, the black, or hard maple; the other the white, or soft maple; the former makes infinitely the best grained and best flavored sugar, and fully equal in quality to the best Muscovado."

The sugar once made, the Indians used it in a variety of ways. They mixed it with melted bear's fat to make a sauce to dip their roasted venison in; they sweetened their boiled corn with it; they combined it with powdered parched sweet corn to make a light ration, a few spoonfuls of which, softened with spring water, sufficed for a meal on long journeys; or they used it by itself as an emergency ration,—thus proving themselves forerunners of the "Chocolate Soldier." Certain tribes would scarcely have known how to get along without their *aninatik sinzipakwat* (maple tree sugar). In fact, the Iroquois called the Algonkians *ratirontaks*—"tree-eaters"—because of their dependence on maple sugar.

Had there been a shortage of white sugar in colonial days, the Hoover of that time would have had no difficulty in finding a way out. Even now, there is no reason why the sugar maple should not bear a loyal share in food conservation.

The Indiana State Board of Forestry has issued a bulletin urging an increased output. This bulletin says: The high price of sugar and the necessary conservation of the supply are sufficient reasons for us to make as much maple sugar and syrup this year as possible. In 1900 Indiana produced 179,576 gallons of maple syrup, while Ohio produced five times as much. In 1910 Indiana produced 273,728 gallons and 33,419 pounds of sugar, the equivalent of 850,000 pounds of sugar. There are reasons to believe that Indiana could easily double her output, which means a production of a million and a half pounds of sugar, if the owners of small numbers of trees would tap them. The statistics available give the average production of sap as 20 gallons per tree, and it takes about 40 gallons of sap to make a gallon of syrup. It is to be remembered that the flow of sap and the sugar

content varies as to year and the time of the season it is produced. The sap can be gathered in wooden or galvanized buckets. The latter with covers are considered the best. As soon as you can estimate the number of buckets and spiles you will need, your order should be placed for them in order to be sure they can be had when needed.

The producer of maple syrup usually gets from \$1.50 to \$1.75 per gallon for his product. At the present price of sugar, no doubt the price next year will be greatly increased. The profit of the industry depends upon the amount of help that must be hired. If one who has a sugar orchard is not busy during the period of syrup production and has home help sufficient to run a camp, the making of maple syrup is profitable. We have a report from one man who tapped 175 trees which made

75 gallons of syrup, which he sold for over a hundred dollars.

Now it is the duty of every one who has sugar trees to make sugar or syrup this year, for this would do much to relieve the sugar famine. If you cannot tap your own trees, possibly a neighbor would be glad to do so. It is not an infrequent thing to haul maple syrup several miles; thus one operator could work all the small woods in his neighborhood. The injury to trees from tapping is negligible. If you have sugar trees and cannot work them this year yourself, do not wait for some one to come to you to ask to work them. Get busy and hunt up some one who would be willing to work them on shares. Remember that "sugar" will not only catch flies, but without it we couldn't have caught "the Kaiser."

FEDERAL LEGISLATION NEEDED

FOLLOWING are salient points from the very fair, moderate and well formulated recommendations of the Forest Service to the United States Senate with reference to desirable forest legislation.

1. Co-operation with States in Fire Protection, Forest Renewal and Classification of Lands as between timber production and agriculture with initial annual appropriation of not less than \$1,000,000 expendable in co-operation with the States.
2. Extension and Consolidation of Federal Forest Holdings, continuing the purchase of forest or cut-over lands with annual appropriation of at least \$2,000,000.
3. The Reforestation of Denuded Federal Lands, to be completed in not more than twenty years,

this being most urgent on denuded watersheds.

4. A study of Forest Taxation and Insurance with devising of model laws on forest taxation, co-operation with State agencies in promoting their adoption and development of forest insurance.

5. Survey and Classification of Forest Resources to determine the present volume and production of each class of timber in every important forest region, and ascertain the requirements, as to quantity and character of timber, of each state and of every important wood-using industry.

6. Current Appropriations for Forest Research to maintain Experiment Stations in all the principal forested regions of the United States.—*The Lumber Bulletin*.

FOREST CONSERVATION BY BETTER UTILIZATION

(Continued from page 683)

industries which promise possibilities of developing better utilization. If a general survey could be made of the wood-using industries sufficient to bring together an intelligent and analytical summary of utilization possibilities and if this summary were stripped to what appears sanely practicable, we all would undoubtedly be somewhat staggered at the opportunities lying at our very doors. In the few instances cited a saving of well over 10 billion feet was indicated, but assume that in the whole field the most that could be hoped for by good business utilization amounts to 10 billion feet annually.

That would mean 10 billion feet of ripe timber saved each year. It would save one year's supply every fourth year. It would prolong by 25 per cent the timber reserve—the forest insurance assets—of the wood-using industries. To accomplish that by planting new forests and growing new timber will require annually almost half a million acres, a cash outlay of some 10 million dollars followed by 80 to 100 years of upkeep and protection. Furthermore, in the working out of the forest problem, the most critical times will come in the period between the exhaustion of the present forests and the maturity of new forests. The possible saving annually of 10 billion feet of timber on the stump is worth looking into and the wood dependent industry that doesn't see it is blind to its own interests and to its opportunities.

Without minimizing in any degree the importance of forest production, the field of conservation by better utilization stands out therefore as an intensely practical means of accomplishing immediate results in reducing the drain upon the timber we already have—timber produced in the course of hundreds of years of growth and renewable only in the same way. Immediate steps towards forest production are needed to provide timber for the future; conservation by better utilization accompanied by adequate forest protection is needed to keep timber behind your factories and to bridge the critical gap of an intervening shortage which already impends.

This organization now in process of formation has before it this great field of possibilities for service to itself and to its customers—the public. Once thoroughly organized with all wood-using industries represented, the field could be critically and intelligently surveyed and a definite program drawn along those lines promising greatest return. That program will necessarily be one of research—research in the sense of collecting and co-ordinating information which although now available is so widely disseminated as to prevent intelligent and constructive application and research of the more intensive kind which seeks to yield new information needed in developing the most productive measures of conservation by better utilization.

COX FOR A FOREST POLICY

A STATEMENT BY GOVERNOR JAMES M. COX OF OHIO, DEMOCRATIC CANDIDATE FOR PRESIDENT, ON THE NEED OF A NATIONAL FOREST POLICY FOR THE PERPETUATION OF OUR FOREST RESOURCES

THE proclamation by President Wilson of Fire Prevention Day, October 9, brought before the country, in a striking way, the necessity of conserving the nation's resources, which is one of the greatest internal questions of the country. Millions of dollars are invested in business dependent on forest products. Our forest fire bill is \$30,000,000 annually. The mounting cost of print paper and lumber is enormous.

"The report of the Forest Service, in response to the Senate resolution calling for information on forest depletion, discloses facts that must bring to every one a realizing sense of the great importance and necessity for conserving our forest resources. There are now in the United States, this report shows, 81,000,000 acres of waste forest land, devastated by cutting and by fires. Nothing of value is growing on these lands, or likely to grow without a huge expenditure for reforestation. Besides this we have an area of comparatively unproductive second-growth forest three times as great as the waste land area. Each year we cut off 5,500,000 acres and burn on the average no less than 9,400,000 acres.

"And the destruction proceeds. Of the vast primeval forest that constituted so considerable a part of the great natural wealth of our country, only two-fifths remain, and this remainder is being consumed four times faster than it is being replaced.

"The conservation of our timber resources involves the two-fold consideration of replacement and protection. We have been neglectful in both respects.

"There are 315,000,000 acres of state and privately owned forest lands in the United States, in the protection of which the Government should co-operate. Half of this vast area at present is wholly without protection, according to estimates of the American Forestry Association,

and the other half is protected but inadequately. If these lands are to be kept productive, there must be greater and more efficient efforts by the Federal Government, the states and private owners in the direction of fire protection.

"Many industries have been unable to obtain their supplies of timber at any price. In other industries the output has been reduced by as much as fifty per cent. Anything that adversely affects the lumber and wood-using industries of the country naturally reacts to the disadvantage of consumers. The Lake States, once the center of the lumber industry, now pay millions of dollars in freight rates on lumber to keep their wood-using industries going, and the center of the lumber industry is moving toward the Pacific Coast.

"The movement upward of wholesale prices on upper grades of soft wood lumber in one state through a period of years is illustrative of what confronts other states as a consequence of a neglectful policy of conservation. In New York these prices were from \$20 to \$25 per 1,000 feet prior to 1865, when mills in the state supplied the market; between 1865 and 1917, when most of the supply came from the Lake States and the South, the price had advanced to from \$35 to \$45. These prices are now entering a general level of \$130 per 1,000 feet, with a large part of the material coming from the Pacific Coast.

"Seventy-five per cent of the difficulties confronting us in the task of keeping our forest lands productive will be overcome by adequate fire protection of our forest lands. The necessity of fire protection, not alone for the manufactured products but for the source of the raw materials of these products, can hardly be overemphasized and should be kept always prominently before the nation. Action is requisite to the solution of conservation problems and it is one of the things I will strive for early if elected."

BRITAIN PLANTS AMERICAN TREE SEED

ADVICES received from British forestry officials regarding the distribution of the forest tree seed which was presented to England last year by the American Forestry Association show that the seeds have been sown in nurseries managed by the English Forestry Commission. One hundred and sixty pounds, or almost all of the Douglas fir seed sent to England, was sent to Ireland, where the climate seems to be particularly favor-

able to its growth. When the young trees have attained sufficient size, they will be planted out in the forests which the Commissioners are establishing in various parts of the United Kingdom. The Secretary of the Commission writes of their appreciation and says: "They will be of real assistance in helping to increase our timber resources, which were so greatly depleted for war purposes."

PORTUGUESE APPRECIATION OF TREES

In many places where timber trees are to be found in Portugal, one sees the following inscription—in woods, parks and gardens:

To The Wayfarer.

Ye who pass by and would raise your hand against me, hearken ere you harm me.

I am the heat of your hearth on the cold winter nights, the friendly shade screening you from the summer sun,

and my fruits are refreshing draughts quenching your thirst as you journey on.

I am the beam that holds your house, the board of your table, the bed on which you lie, and the timber that builds your boat.

I am the handle of your hoe, the door of your homestead, the wood of your cradle, and the shell of your coffin.

I am the bread of kindness and the flower of beauty.

Ye who pass by, listen to my prayer: harm me not.

*Douglas Fir
Northern White Pine
Idaho White Pine
Western Soft Pine*



*Western Hemlock
Washington Red Cedar
Red Fir and Larch
Norway Pine*

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YOU have heard men say that good lumber is scarce. They say that lumber isn't what it used to be, and that we must soon come to use substitute materials.

Do you know how much good lumber there is in this country today? With the possible exception of the hardwoods, there is as much good lumber available for construction purposes as there ever was at any time since America became a nation.

There is more standing timber today in the United States than ever was made into lumber since the Pilgrims landed on Plymouth Rock.



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To this end we will supply to lumber dealers and to the public any desired information as to the qualities of different species and the best wood for a given purpose.

This service will be as broad and impartial as we know how to make it. We are not partisans of any particular species of wood. We advise the best lumber for the purpose, whether it is a kind we handle or not.

What we advocate is conservation and economy through the use of the right wood in its proper place.

If we could insure your getting the wood you ought to have, it might mean a difference of years in the life and service of the lumber—fifty years, perhaps, as against a few months. So important is the selection of the right wood or grade of wood for a given use.



From now on the Weyerhaeuser Forest Products trade-mark will be plainly stamped on their product. You can see it for yourself at the lumber yard or on the job after it is delivered.

When you buy lumber for any purpose, no matter how much or how little, you can look at the mark and know that you are getting a standard article of known merit.

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Ground Wood Pulp**

DOMESTIC EXPORT

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

IT is interesting to note the increasing use of aircraft in forestry work. Besides the two Canadian companies operating their own fleets, one of two seaplanes and the other of three, the Air Board in co-operation with the Department of Lands and Forests of Quebec, has established a station on Lake St. John and will patrol for forest fires and take photographs of unexplored country. The same work will be done in British Columbia in co-operation with the Forestry Branch. A flight to determine roughly the areas in western Quebec and eastern Ontario infested with the spruce bud-worm was made by the Air Board, carrying representatives of the Entomological Branch of the Commission of Conservation. A flight has also been made from Cochrane to James Bay and moving pictures were taken of the country passed over, the time occupied by the flight being about two and one-half hours. It will now only be a short time before we shall have reconnaissance maps of eastern Canada which will show conclusively where our timber lies and of what species it consists.

An interesting study is being carried out jointly by Price Brothers and Company and the Laurentide Company. The former have had made a contour map of fifty square miles of timberland and from this constructed a relief map or model, showing the types and quantities of timber, drainage, contours, etc. The Laurentide Company is taking photographs of this same territory which will be built up into a mosaic which can be studied in conjunction with the model. Interesting results are expected.

Photographs of many different types of country and timber have been taken by the Laurentide Air Service, many showing pure stands of white and jack pine, spruce, etc. To add to the collection, the Lord Lovat, K. T., K. C. M. G., D. S. O., Chairman of the British Forestry Commission, is arranging to have the British Air Service take photographs of pure stands of oak, larch, Douglas fir, Sitka spruce, Corsican and Scots pine and also typical English forests.

The Quebec Forest Service has arranged to send four forestry students to Europe, some to Scandinavia and some to France to study foreign methods. The appropriation for the Forest Service will also be increased.

A long step in forestry progress has been made in Ontario by the appointment of E. J. Zavitz, Chief Forester to the position of head of the Woods and Forest Branch. Heretofore the work of timber sales, superintending cuttings, etc., was

under a non-technical man, leaving the Chief Forester only the fire protection and nursery work. All forestry matters will now come under him. This will bring Ontario into line with the other Provinces, and good results are looked for.

Hon. Dr. E. A. Smith, Minister of Lands and Forests of New Brunswick, has resigned, due to a difference of opinion between himself and his colleagues as to the new stumpage dues and the location of a game preserve. This is lamentable, as Doctor Smith organized the present Forestry Department, which is a model organization, and under it the revenue from the forests has increased markedly.

This season the white spruce has seeded heavily for the first time since 1917, and much seed has been collected. The Province of New Brunswick collected 1,000 bushels and the Laurentide Company, Ltd., 600 bushels.

The Brown Corporation of Berlin, New Hampshire, have plans for a nursery which will enable them to plant five trees for every one they cut. This should point the way to other American companies whose pulpwood supplies are running low.

Mr. A. D. Otty has been engaged as Forester by the reorganized Dryden Pulp and Paper Company of Dryden, Ontario.

The meeting of the Pacific Logging Congress was held this year in Vancouver, October 6, 7, 8 and 9th.

Lord Glentanar, of Glen Tanar, Aberdeenshire, Scotland, was recently in Canada. He owns a large forest property and has the misfortune to have had the only disastrous forest fire in Scotland for nearly one hundred years. Twelve hundred acres of forest were burnt. The fire was probably caused by carelessness and burnt for a long time, owing to the character of the soil. Before returning to Scotland, Lord Glentanar purchased a gasoline forest fire pump and hose for use in case of emergencies.

Professor Leslie, of Aberdeen University, Scotland, is at present studying forestry conditions in Canada, and gives the following account of the planting activities of the British Forestry Commission along nursery lines in that section. In the Craibstone, about five miles from Aberdeen, in 1918, 800,000 seedlings were grown and planted out in areas acquired by the Commission. In 1919, 2,000,000 seedlings were lifted and transplanted. Last spring, 2,000,000 seedlings were transplanted. These were mostly Scots Pine, larch and Sitka spruce. In the spring of 1919, extensive sowings were made in the Improvement

Park and in the Woodlands Field nurseries. Woodlands Field now has 1,300,000 spruce and 1,000,000 larch two year seedlings and the Improvement Park 5,000,000 larch, 4,800,000 Scots pine, 1,000,000 Japanese larch, 1,500,000 Sitka spruce, 100,000 American white spruce, 1,500,000 Douglas fir and 10,000 Austrian pine. Double the above quantities were sowed this spring.

The Laurentide Company, Ltd., is cutting one thousand cords of hardwood to be used in the manufacture of ground wood pulp. The species being cut are poplar, white birch, yellow birch and maple. The two first will be floated and the two latter will be transported in barges.

The following is interesting: Representations having been made to the Queensland Government that the export of large quantities of softwoods—hoop pine and bunya—from the state, principally to the other states of the Commonwealth, had created a serious shortage of pine in Queensland and at the same time had the effect of causing increased prices, a proclamation has been issued which will have the effect of seizing all logs arriving within 25 miles of Brisbane or Maryborough, and owners of such logs will have to apply to the Government before same can be exported.

STATE NEWS

MINNESOTA

MORE than \$375,000 will be derived from the sale of stumpage from state school and swamp lands this year as a result of the cuttings completed during the 1919-1920 logging season, according to the state auditor.

The money derived from the sale of this stumpage is paid into the state trust funds, the majority being credited to the swamp lands fund and the balance into the school fund of the state, both of which are included in the trust fund.

The amount of timber stumpage cut in the season recently closed, falls a trifle short of that cut in previous seasons, because of the labor shortage and the early snowfalls which hampered the work of cutting in woods and swamps in the northern part of the state, according to Otto Diercks, superintendent of the land and timber department in the office of Auditor Preus.

The prices received for stumpage during the past season have been more than doubled over those received during the past four years, and the market at this time commands up to \$15 per thousand feet on pine stumpage; on spruce stumpage the state receives up to \$10 the thousand feet. Ties are sold for up to 25 cents each and cedar posts are sold at the rate of three cents each. Cedar poles command a price of from 30 to 40 cents each.

The approximate value of timber remaining to be cut on state lands during the next decade of years is estimated at from \$10,000,000 to \$15,000,000, according to Mr. Diercks.

NORTH CAROLINA

IN connection with the approach of the fall fire season, the Forestry Division of the North Carolina Geological and Economic Survey announced that it succeeded in securing the services of an experienced forester who will devote practically his whole time to the prevention of forest fires in North Carolina.

Mr. William D. Clark, the new Assistant Forester, comes from New England, where fire prevention has been developed to a science, and is a graduate of the Yale School of Forestry, probably the leading institute of its kind in America. Mr. Clark combines the enthusiasm of the North with the tact and courtesy of the South, which eminently fits him for dealing with the varied problems which are inevitably connected with the work of fire prevention.

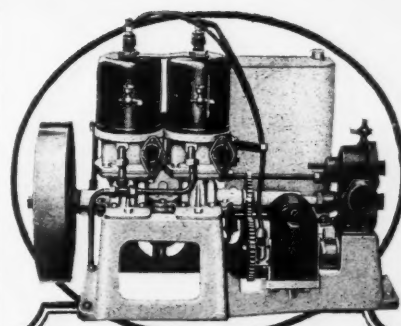
The Federal Government has for the past few years been contributing from two to three thousand dollars a year towards forest protection in North Carolina, and the State has been spending a somewhat greater amount. Satisfactory results have been secured on certain restricted areas, but the funds have been sadly inadequate. Congress will this winter be asked to greatly increase its appropriation, so that at least \$10,000 will be available for fire protection in this State.

The work of extending and making more effective this forest fire prevention will be largely left to Mr. Clark, who will do the work of a State Forest Fire Warden.

OREGON

GOVERNOR OLCOTT, of Oregon, has appointed a committee to look into possibilities of preserving tree growth along highways of the state. The subject has recently received considerable attention in the press of Oregon, but is by no means a new subject. It has been up locally in many sections of Oregon and Washington and probably in other northwestern states also. The public takes kindly to the idea of having highways bounded by forest trees which it has taken 300 years to grow. There is every reason why this should be the case for timber lands freshly cut or burned over are unsightly.

But there are other sides to the question also. Narrow strips of timber, except in very sheltered places, will not be wind



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firm and leaving such strips to blow down can only result in loss and an unsightly tangle along the highway.

Then again, there is the even more serious obstacle of acquiring the land and timber. A strip of timber 200 or 300 feet wide and ten miles long on each side of a highway would represent even at very low stumpage rates, a value of quite a few thousand dollars and there are many ten mile strips it would be desirable to have lined with trees.

Obviously the state or county could not expect an owner to donate to the community a considerable amount of timber on which he has paid taxes, protected against fire and against which many other charges have been piled up over a series of years. Just as obviously the state probably could not invest a large sum in timber along highways for, as stated, unless conditions were unusual a large part of it would probably blow down.

It is believed that everything possible consistent with sound public policy should be done to preserve the beauty of highways. But it is thought too that this can best be done by working out a careful plan with this in view. Such a plan Governor Olcott's committee will doubtless present in due time. One thing is certain; if fire is kept out of cut-over land for a few years sufficient young growth will come in so that it is no longer unpleasant to look at. This will doubtless be the solution along many miles of highway. Groups of wind firm trees or even individual wind firm trees can possibly also be found along certain stretches of road to form a nucleus for future forests.

The problem is an interesting and important one and like all important problems will take time to work out in the best interests of the public and with proper regard for property rights.—*The Forest Patrolman*.

"A fresh memorial, as each year
New life and buds and leaves appear.
A living monumental tree
True type of immortality."

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BOOK REVIEWS

"Modern Pulp and Paper Making, A Practical Treatise," by G. S. Witham, Sr. Published by The Chemical Catalog Company, New York, N. Y.

This book is a comprehensive account of pulp and paper manufacture from the saw-mill to the finished product. It is perhaps of particular significance because it is the first really complete, non-technical description of the pulp and paper industry as it is conducted in America. The industry has developed along quite different lines here from what it has in Europe, so that the European literature on the subject has been inadequate, even for those who could read it, to give any clear idea of just how pulp and paper are made in this country. Mr. Witham's book therefore meets a distinct need.

The publication is, as its title indicates, a "practical" one. While enough of the theory of pulp and paper making is given to furnish a background for the study of specific processes and methods, there are no learned discussions of the rather complex chemistry involved. Some of the simpler chemical reactions are explained, but the reader who wishes to probe deeper is referred to scientific works along this line and particularly to Griffin's and Little's "Chemistry of Paper Making."

The book is intended primarily for the practical paper maker. It is, therefore, simply written and no attempt is made to discuss the history of paper making, to go into details regarding the chemistry involved, or to describe every piece of equipment ever used in the industry. It does, however, contain a strikingly complete description of the various processes by which pulp and paper are made and the equipment used. A chapter is devoted to the personnel of a pulp and paper concern, in which the necessity for co-operation among the employees and between the employees and the management is strongly emphasized. Many tables and other useful information are included, and practically the only thing lacking to make the work complete is a bibliography of other literature on the subject.

Taken all in all, the book is an excellent one which should fill a long-felt want. It will undoubtedly prove useful not only to the practical paper maker, for whom it is primarily intended, but also to many technical men not intimately in touch with the industry who desire to know the salient facts concerning it.

"NORTH American Forest Research," compiled by the Committee on American Forest Research, Society of American Foresters. Published by the National Research Council, Washington, D. C. Price, \$2.00.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

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This bulletin contains, by individual projects, a compact statement of all the forest research now being conducted in North America. It covers the entire field of forestry, including not only such subjects as dendrology, silviculture, forest mensuration, forest protection, and forest management, but also investigations in forest products,

forest pathology, forest entomology, and grazing. The bulk of the work is naturally being handled by the United States Forest Service. The extent of the studies being conducted by States, educational institutions, and private interests will, however, be a source of surprise to those who have not kept in close touch with the progress of forest research in North America.



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Tales from the X-Bar Horse Camp. By Will C. Barnes, Breeders' Gazette Press, Chicago, Illinois. \$2.50.

Fresh from the press, this collection of stories by Will Barnes, of the Forest Service, will make instant and lasting appeal to every lover of the great Western country. They are cracking good tales of the camp and trail and the beautiful photographic illustrations add greatly to the personality and charm of the book.

The History of Cuba. Published by B. F. Buck & Company, New York, in five volumes.

This is the only history of Cuba that has been written in any language in any way approximating the full scope of the theme. A reviewer has said that it is more than a history of Cuba—it is a prelude to the history of the United States, of the American continents, of the Western Hemisphere. It antedates all other American history, since Cuba was the first land reached by Columbus the identity of which was never in dispute, and all histories of the Western world perforce begin with Cuba. It was here that Columbus made his first exploration of lands in the Western Hemisphere. It was because of Cuba that Ojeda and Enisco planted colonies upon the South American continent and that Balboa discovered the Pacific and Pizarro conquered Peru. It was from Cuba that Cortez proceeded to the conquest of Mexico, and that De Sota planted colonies in Florida and discovered the Mississippi River; and finally in Cuba the rivalry between Spain and England for American mastery was fought to a finish. This history sets forth for the first time in its fulness the story of Cuba's rise from a colony to a nation, a story of which even Cubans themselves know little and the rest of the world almost nothing, but which in its bewildering wealth of legendary lore, of tradition, of authentic romance, adventure, heroism, comedy and tragedy ranks well with that of any land of earth. It tells for the first time it portrays finally the resources of the island, its potentialities, its opportunities, its beauties and charms, its political, social and intellectual life. It proves unquestionably how well worth while it will be to cultivate the acquaintance of Cuba—the "Queen of the Antilles"—and to improve the unsurpassed opportunities which she offers to the investor, the colonist, the commerce of the world as well as to the traveler in quest of health, pleasure, delightful climate, wonderful scenery and all that one of the most richly endowed lands of the world can give. Dr. Willis Fletcher Johnson, the distinguished professor of the History of Foreign Relations in New York University, and recognized as one of the most interesting and authoritative historical writers in American literature is the principal author and editor of the entire work.

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FOREST SCHOOL NOTES

BATES COLLEGE, MAINE

PRACTICAL work in forestry, in the 14,000 acres in York County held by Bates College, is to be a feature of the course which the college is offering students for preparation for graduate schools of forestry, for information in a general way and to fit men to take subordinate positions in the lumbering business and other woods industries, in paper and pulp mills, in the state forestry service as guards or rangers, or as managers of private tracts of timberland.

"Maine has a wonderful opportunity to develop her forests," said Professor Bernard E. Leete, assistant professor of forestry, "for the land is naturally hilly and rocky in many places and on such farms the owner might well have done better, in years gone by, had he whittled and waited in the back yard, instead of trying to clear the land of the trees. The latter, grown to maturity and properly lumbered would have netted him larger returns than the meager crops such soil could produce. Trees require only quarter the salts and other chemicals which garden crops require and they can be grown on steep slopes otherwise difficult to till.

"Maine, already as a state, has developed a wonderfully effective system of fire protection; and now it seems to me that the time is at hand when much can be accomplished in practical forestry. It is high time that New England took the second step that will insure permanent woodlands. Intensive forestry, such as is practiced in Europe, will be the last step—yet some distance in the future. The prospects seem bright to me for this line of work in this part of the country."

UNIVERSITY OF CALIFORNIA FORESTRY SCHOOL

WHEN classes assembled on the opening day, August 17, it was announced to us that we were facing the largest enrollment in history (over 9,000) and that facilities in many departments of the University would be strained to the breaking point in accommodating the students. The forestry division is fortunate in having sufficient elbow and breathing space as its growth in enrollment has been steady but not phenomenal. Forty-one students are majoring in forestry and the Forestry Club is looking forward to an active year.

On August 25, Professor W. L. Jepson gave an illustrated lecture on the redwoods of California, under the auspices of the Forestry Club. The large hall was crowded and it was evident that a majority of the auditors were convinced that the "Save the Redwoods League" is doing a splendid work in its effort to preserve a number of choice redwood areas as nation-

al or state parks.

Professor Walter Mulford, who is acting Dean of the College of Agriculture this year in the absence in Europe of Dean Hunt, welcomed old and new members of the Forestry Club at his home on the evening of September 1. These meetings by his cozy fireside are an annual event, greatly enjoyed by all members of the club.

The summer camp this year was a decided success from every point of view, eleven men being in attendance for the course of thirteen weeks. The camp site, near Meadow Valley on the Plumas National Forest, is a spot of rare charm and beauty, the influence of which is reflected in the pride and care the boys took in making the camp a model of neatness and comfort. Professor Metcalf opened the camp and conducted the work in use of instruments and laying out primary control lines. Professor Bruce followed with work in mensuration, growth and logging studies, while Professor Fritz took the class to various saw mills in the vicinity. It was a great summer for all concerned, and by no means the least enjoyable parts of it were the excellent fishing to be had near camp, the daily visits to the "ol' swimmin' hole" and long evenings spent around the blazing camp fire.

After completing his work at summer camp, Professor Metcalf took a short leave of absence from the university and conducted a timber survey in the Selkirk Mountains for the Canadian Pacific Railway.

During the early part of the summer, Professor Fritz spent several weeks in a study of sawmill conditions in the redwood region.

Professor Bruce has just returned from a visit to the logging operations of the Weed Lumber Company, where Blair and Sharp, graduates of last May are being introduced to the practical side of the lumber business. From all accounts, both men are making good with a vengeance.

We are all looking forward to the return in December of Professor D. T. Mason, who has been on leave of absence for nearly two years, as Timber Valuation Expert with the Treasury Department in Washington.

The Forestry Club at its meeting September 15, selected committees for the year and discussed plans for the meeting of the Intercollegiate Association of Forestry Clubs to be held here early in 1921. It is hoped by the committee in charge that a joint meeting may be arranged for the delegates, supervisors of District V, United States Forest Service, and the California section of the Society of American Foresters.

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COLORADO AGRICULTURAL COLLEGE, DEPARTMENT OF FORESTRY

A COURSE is being offered for the first time by the Forestry Department of the Colorado Agricultural College for the preparation of forest rangers. This course will be offered in the "School of Agriculture," which is of secondary grade, corresponding to an agricultural high school, or as preparatory to entrance to the Agricultural College.

The "School" is conducted by the College, and the most of the teachers are college faculty members. The Ranger Course requires three years and makes optional a six weeks summer course in forestry practice. Two courses in forestry are offered each semester, or twelve forestry courses during the complete period of three years.

It has been the experience of the Forest Service in Colorado that 90 per cent of Forest rangers leave the Service within a ten-year period to enter usually some ranching or agricultural work. Forest rangers are commonly young men who

later enter other vocations, but they perform a wonderful public service. Meagre pay by the Government causes the most of them to enter more remunerative fields.

The object of the Ranger Course is to fit young Coloradans for effective work as rangers, and for their later work as agriculturists when they shall have served a number of years as rangers. The College is also progressing satisfactorily with its higher or professional forestry instruction.

NEW YORK STATE COLLEGE OF FORESTRY AT SYRACUSE

CHARLES E. SIFFERLEN, of Brooklyn, a graduate of the New York State College of Forestry, who went to the Yale Forest School for his graduate work, has been named instructor in forest engineering at the New York State College of Forestry at Syracuse, filling the vacancy caused by the resignation of Oliver M. Porter to become Assistant Secretary of The American Paper and Pulp Association. He will report for duty at once, and his first work will be the taking charge

of field work of the sophomore class of the college. He was with the forest engineers in France, and was later in Canada for an American paper company.

Another shift in college circles was the securing of J. Elton Lodewick, a recent graduate of Syracuse, by the University of Maine, as instructor in dendrology and forest pathology in the biology department. Mr. Lodewick graduated at Syracuse in 1919, received his master's degree last spring, and has since then been assisting Dr. Harry P. Brown, of the technology department, in research work.

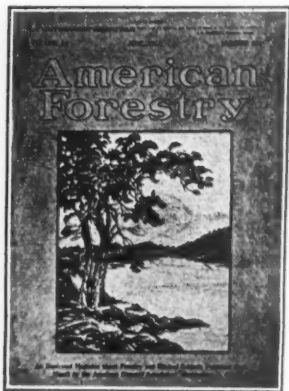
The summer camp of the college on Cranberry Lake has been the most largely attended in the history of the college, for not only the summer camp has been engaged with the sophomores, but a special camp under special instructors, has been conducted for others interested in forest problems during the entire summer.

Special work in study of forest insects has been done by several New York State College of Forestry faculty men and research men from other states, in the college forest insectary.

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POSITIONS WANTED

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

GRADUATE of the Ranger Course of the Lincoln Memorial University, Harrogate, Tennessee, wishes to secure work as a forest ranger or guard. Twenty-four years old. Address Box 965, care American Forestry, Washington, D. C. (11-1-21)

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C.

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MAN WANTED with technical training and practical experience sufficient to make him thoroughly competent as a developer of Park plans, and also Park Superintendent—both in road construction, planting and landscape work—and Director of Forestry Service upon the public streets and parks of the city. Address Box 910, American Forestry Magazine, Washington, D. C. (6-9-20)

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SMOKERS URGED TO USE CARE IN THE WOODS.

AS a basis for securing co-operation of tobacco users in the reduction of losses from forest fires, the Forest Service of the United States Department of Agriculture is gathering information as to the extent to which fires in the woods are due to smokers.

"We have been gathering statistics for a number of years as to the causes of forest fires," said Acting Forester Sherman recently in outlining the plan, "but these statistics have not shown under a separate heading fires known to have their origin in tobacco smoking. All fires started by hunters and fishermen, for example, are commonly classed as campers' fires; those started by loggers, to lumbermen; and so on. From now on our men in the field making reports will be asked to indicate, so far as they are able, how many fires are started by smokers.

"A burning cigarette end seems such a small matter that relatively few people trouble to be sure that it is out before tossing it away. In the western national forests, where in the summer every spark of fire is particularly dangerous on account of the dryness of the vegetation, our forest rangers have again and again traced fires back to the point of origin and found there a cigarette butt, from which the fire had spread fan-wise down the wind. Some of these cigarette butts

lay by the roadside where they had been tossed from the cars of automobilists.

"Lumber companies sometimes forbid smoking in the woods. Restrictive measures of this character would not be called for if smokers had a sufficiently keen sense of responsibility, and the habit of care not to drop fire in any form."

The Secretary of Agriculture addressed a letter, to a number of leading tobacco manufacturers not long ago, pointing out that smokers cause many forest fires, that a single fire may cost the Government thousands of dollars for fire fighting, to say nothing of the timber burned up and the landscape desolated, and that by enclosing in tobacco packages some sort of warning against carelessness with fire, the companies could materially aid in the campaign for forest protection. One of the largest tobacco companies in the country answered favorably and requested a suggestion for a slip which might be placed in packages of smoking tobacco, as a warning. The department suggested a legend reading:

CARELESS SMOKERS CAUSE MANY FOREST FIRES,

says the United States Forest Service.
BURNED TIMBER PAYS NO WAGES!

.....asks
your help to prevent fires.

Be sure your match, pipe ashes,
cigarette are out before you let them
fall.

FOREST RANGER EXAMINATION

IN order to fill vacancies in the ranger force of the Forest Service, the United States Civil Service Commission announced an open competitive examination for forest ranger on October 25. In Arizona the examination was held at Clifton, Flagstaff, Prescott, Roosevelt, Safford, Snowflake, Springerville, Tucson, and Williams, and in New Mexico at Alamogordo, Albuquerque, Magdalena, Santa Fe, Silver City, and Taos. Persons desiring to take such examinations should secure application Form 1312 from the Civil Service Commission, Washington, D. C., from the Forest Supervisor at any of the examination places above mentioned, or from the District Forester, Albuquerque, New Mexico.

"A AMERICAN FORESTRY, in my opinion, is going ahead faster than almost any magazine I know of. I have found it this year of very great value in my administration of this park. You are certainly to be congratulated upon the beauty of the magazine, as well as upon the quality of its articles and editorials."

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